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★ HOW TO DESIGN SWIMMING POOLS—
★ special report

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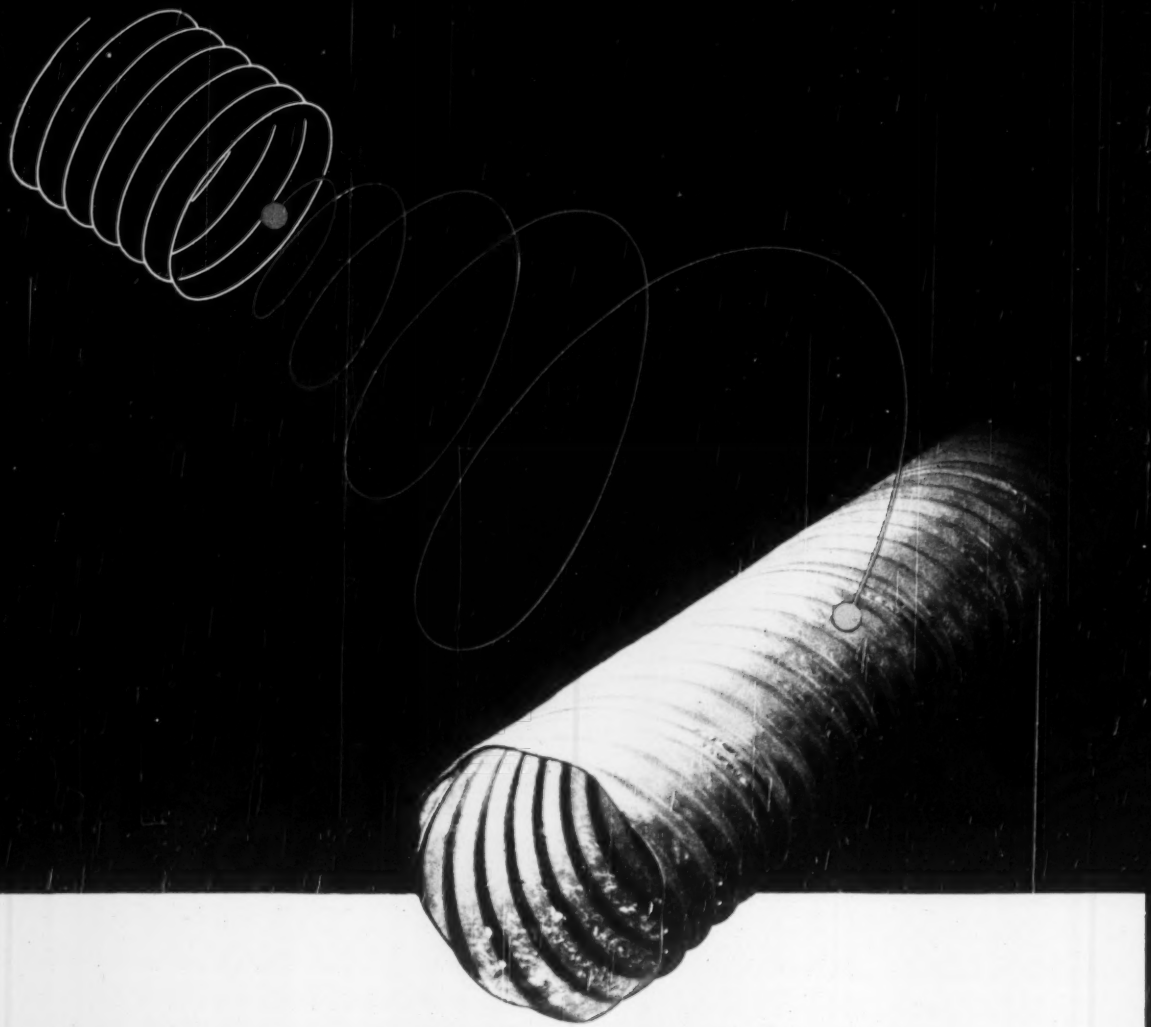

A new twist to an old idea

Corrugated metal pipe had long been known as a low cost, efficient and dependable drainage structure. Could a new twist be given this old idea to make it even better for certain uses? Armco Engineers said: "Yes".

They developed an automatic machine to make corrugated metal pipe by a continuous process. The result was Armco Hel-Cor, a new kind of pipe with helical corrugations and offering exceptional economy in small diameters. Armco Hel-Cor Pipe proved ideal for subdrainage and similar applications. It is low in cost to permit extensive use, easy to handle, durable, and has ample corrugated metal strength. No ring-hung, cracked or disjointed under the impact and vibration of heavy loads. Thousands of installations have brought lower maintenance and greater safety to highways, railways and airports.

Providing better and more economical products to meet specific needs has been standard practice at Armco for more than 40 years. Today you can bring your drainage and construction problems to Armco with full assurance you will receive all the benefits of long experience, extensive research facilities, and a real interest in helping you solve these problems.

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Structural Plate Pipe and Arches ★ Corrugated Metal Pipe ★ Welded Steel Pipe
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The Super Traction, Universal and Rock Logger Silvertowns shown at right are available in the Nylon Cord Tube-type and Tubeless versions.

ALL-NYLON tires offer terrific savings; no flex breaks, no bruise breaks, no blowouts!

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Only B.F.Goodrich gives you the added protection of the nylon shock shield, the added savings from (1) longer tire life (2) increased bruise resistance (3) decreased danger of tread separation (4) more recappable tires. And nylon shock shield costs no extra—you pay no premium!

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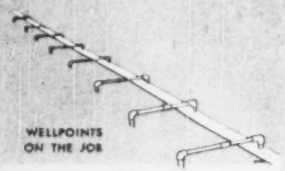

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ENGINEERING NEWS-RECORD

ABP Member ABC

Volume 145 AUGUST 17, 1950 No. 7

WALDO G. BOWMAN
Editor

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August 17, 1950 ENGINEERING NEWS-RECORD Vol. 145—No. 7

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NORTHWEST ADVANTAGES MEAN LOWER OPERATING COSTS

BEFORE THE DAMAGE IS DONE!

Protective devices at this point (between the engine and operating machinery) act after the shock load has passed through shafting and gearing. The Northwest Cushion Clutch catches the overload caused by the inertia stored in the rotating parts ahead of the engine.

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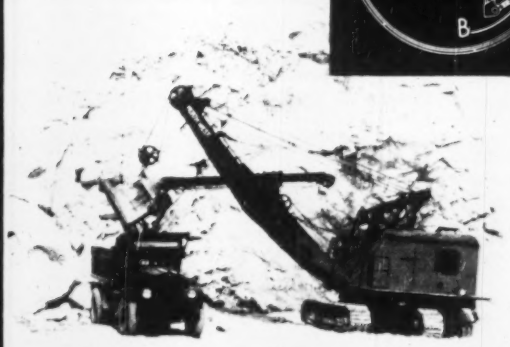

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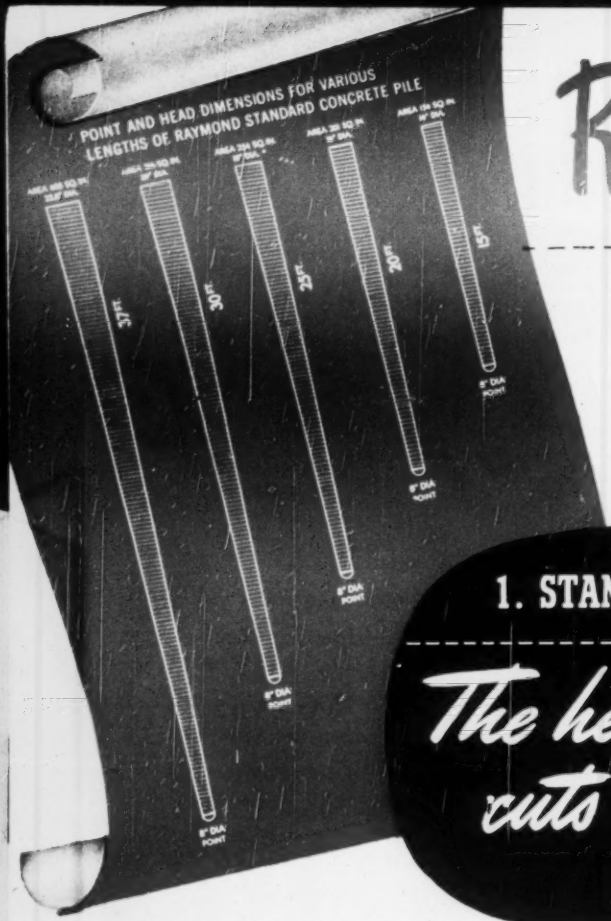


Raymond MAKES 5 TYPES OF CONCRETE PILES

1. STANDARD
2. STEP-TAPER
3. PIPE STEP-TAPER
4. COMPOSITE
5. GOW CAISSONS

Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements.

1. STANDARD PILES

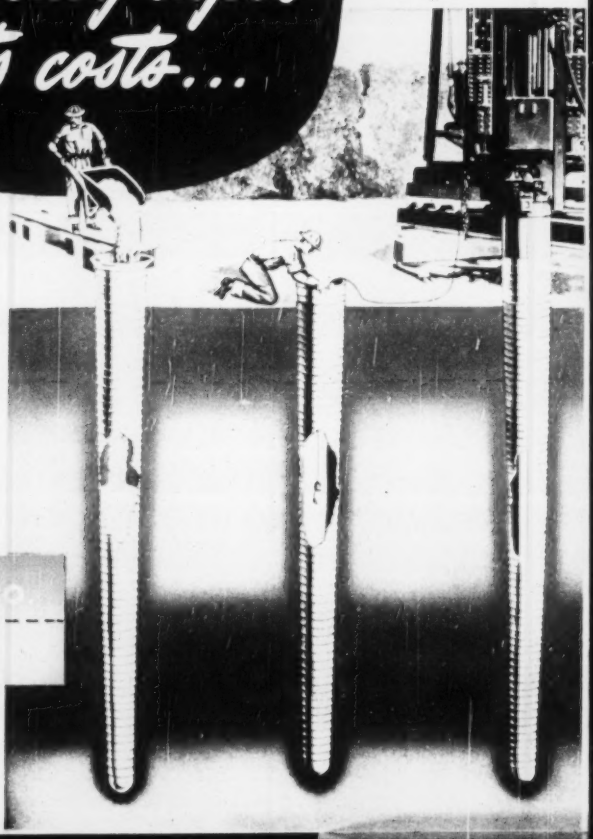
The heavy taper cuts costs...

Note that the permanent steel shell maintains the soil pressure developed during driving and while the concrete is setting, thus insuring a perfect pile free from distortion with a high load capacity.

Raymond Standard Concrete Piles have a heavy, uniformly tapered permanent steel shell. On friction piles, this taper acts like a wedge, giving these specific advantages:

1. Driving resistance is maintained.
2. The load is transmitted to the soil through the entire length of the pile.
3. The load can be carried by shorter piles, because of their greater carrying capacity.
4. Since shorter piles cost less to drive, the taper usually results in substantial savings.

Each of these statements has been tested and proved innumerable times. The evidence is at your disposal at any of our offices. Your inquiry is cordially invited.



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BRANCH OFFICES: Boston, Syracuse, Philadelphia, Baltimore, Washington, Pittsburgh, Atlanta, Miami, Houston, Kansas City, St. Louis, Cleveland, Chicago, Detroit, Portland, San Francisco, Oakland, Los Angeles and principal cities in Latin America.

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LAYING DOWN ON THE JOB! It takes only 25 seconds for the helicopter to lay this 400-foot pipe line. The hose, developed by United States Rubber Company, is folded into a special container and released at the press of a button. Its civilian and military uses are almost infinite.

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You'd be surprised to find how many different things rubber hose can do . . . things it never had been called upon to do before. Come to the foremost authorities in the field, U. S. Rubber, when you have any question that hose may solve. They know about techniques and new methods which may materially lower your operating costs. Write:

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Give your engines more "PUSH"

AND reduce operating costs by lubricating with TEXACO URSA OIL X**

Keep your tractor and truck engines *clean* and you'll have full power when you need it . . . maintenance costs and fuel consumption will both be lower. For heavy-duty gasoline and Diesel engines, the lubricant to use is *Texaco Ursa Oil* X**. It's detergent, dispersive, dependable in even the severest service.

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Crawler track mechanisms run better, last longer, protected with *Texaco Track Roll Lubricant.* It gives long-lasting protection against water, dirt and wear.

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Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

CHAMPION

WORKIN'EST

Here are some of the exclusive features that give the TD-24 its matchless work capacity:

1. 180-h.p. International diesel engine with gasoline-conversion starting and unmatched "lugability".

2. Synchromesh transmission for easy shift-on-the-go operation; plus eight speeds forward and eight reverse.

3. Planet Power drive, smooth and rugged, for instant speed change up or down one gear without declutching.

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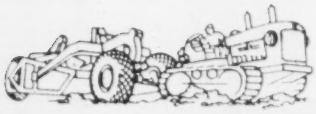

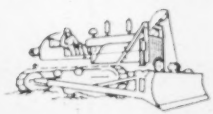

# of Crawlers

TRACTOR ON ANY JOB

● *"THE TD-24 is definitely outhauling every other tractor on the job. It will do so much work that we are sure our job costs will show a great saving!"* That's the report of the foreman on the 247,000-yd. University of Maryland stadium project. • *"I don't have to stop on any grade,"* the operator reports, *"and we have 25% or better on this job. Why, I just go up in 4th gear easy while the other tractors have to switch to low to make it."* And the TD-24 hauls a 17-yard scraper, heaped! • Yes, the TD-24 is the "workin'est tractor" on any job. Yet, its operator is the worker with the easiest day! See your International Industrial Power Distributor. Get a TD-24 demonstration. Discover how you, too, can save job time, cut costs, earn extra profits.

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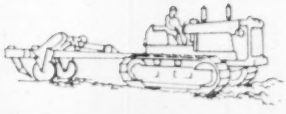

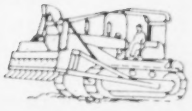

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CORRUGATED METAL PIPE

Speeds Drainage Jobs . . .

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Once in place, Toncan Iron Corrugated Metal Pipe serves for years. It is strong and resilient—able to carry heavy loads—to stand up under vibration, earth settlement and weather changes without cracking or crumbling.

Best of all, Toncan Iron has the highest rust-resistance of any ferrous metal in its price class. It's an alloyed iron containing twice as much copper as copper-bearing steels and irons *PLUS* just the right amount of molybdenum to bring out the full effect of the copper.

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NEWS BRIEFS

No Yardstick—Tennessee's Stream Pollution Control Board will measure pollution by area, with no statewide formula. The agency plans area studies rather than set standards without consideration of water uses. And it promises a "tolerant approach" to pollution problems.

How Much Next Year?—Pennsylvania's Highway Department points with understandable pride to a record of almost 5,000 mi of new or rebuilt roads during the three years ended last May 31. For the fiscal year now underway, it has a $112 million program on the books, and that will be augmented by large expenditures from the $40,000,000 Highway and Bridge Authority fund.

Don't They Now?—A Colorado water district official wants merchants, utilities and other taxpayers in areas benefiting from irrigation projects to help the water users pay for the projects.

Only a Little Pregnant, Eh?—New York State's Housing Commissioner Stichman thinks Washington should be careful not to limit homebuilding too greatly. He says it will dislocate the building industry if there's too much of a cut, will keep War II veterans doubled up with their in-laws and emphasize the "boom/bust" cycle which has been true of homebuilding.

Useful for Sub Patrol—Construction should start next month on the 55-mi coastal highway between Virginia Beach, Va., and Nag's Head, N. C., according to the Virginia Coastal Turnpike Authority. Construction should be ended next spring, the authority said, in time for the start of the tourist season—if any.

Color Change Needed—Los Angeles City Council has turned down again a request by Local 246 of the United Public Workers of America, for deduction of union dues through the municipal payroll system. Local 246 was expelled from its CIO parent sometime ago under the cloud of Communist domination. Dues deduction privileges were withdrawn by the city.

Got Any to Sell?—The Sheet Division of the Aluminum Association has adopted standard nomenclature for the designation of aluminum sheet and plate. Plate is a solid section rolled to 0.250-in. or better thickness, with sawed, slit or sheared edges. Sheet is a solid section rolled to a thickness

(Continued on page 14)

HELTZEL

Heltzel BUILDS IT BETTER

SUPERIOR ROAD & AIRPORT *Forms*

Compare Heltzel forms with any other. Point for point Heltzel forms are outstanding in construction features and on the job advantages. Like all good equipment they afford economies in working time while assuring a better job.

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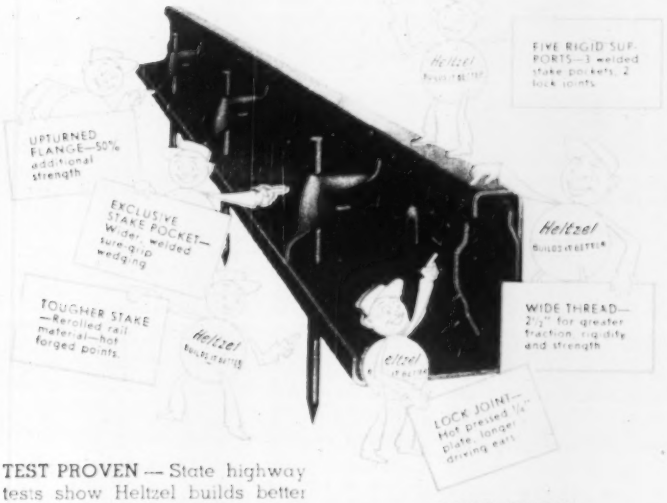
FIVE RIGID SUPPORTS—3 welded stake pockets, 2 lock joints
UPTURNED FLANGE—50% additional strength
EXCLUSIVE STAKE POCKET—Wider, welded sure-grip wedging
TOUGHER STAKE—Rerolled rail material—hot forged points
WIDE THREAD—2½" for greater traction rigidity and strength
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TEST PROVEN — State highway tests show Heltzel builds better forms. Average results prove Heltzel 20% better.

JOB PROVEN — Veteran Heltzel forms can be seen on many jobs — they last longer. They don't wiggle and weave under pressure and movement of heavy equipment — they stake firmly and carry the load.

HELTZEL **DUAL DUTY** FORMS

Each dual duty form can be used to make two thicknesses of concrete slabs. Illustration above shows some form in upright position for 24" slab and side position for 20" slab. Sizes from 6" up.

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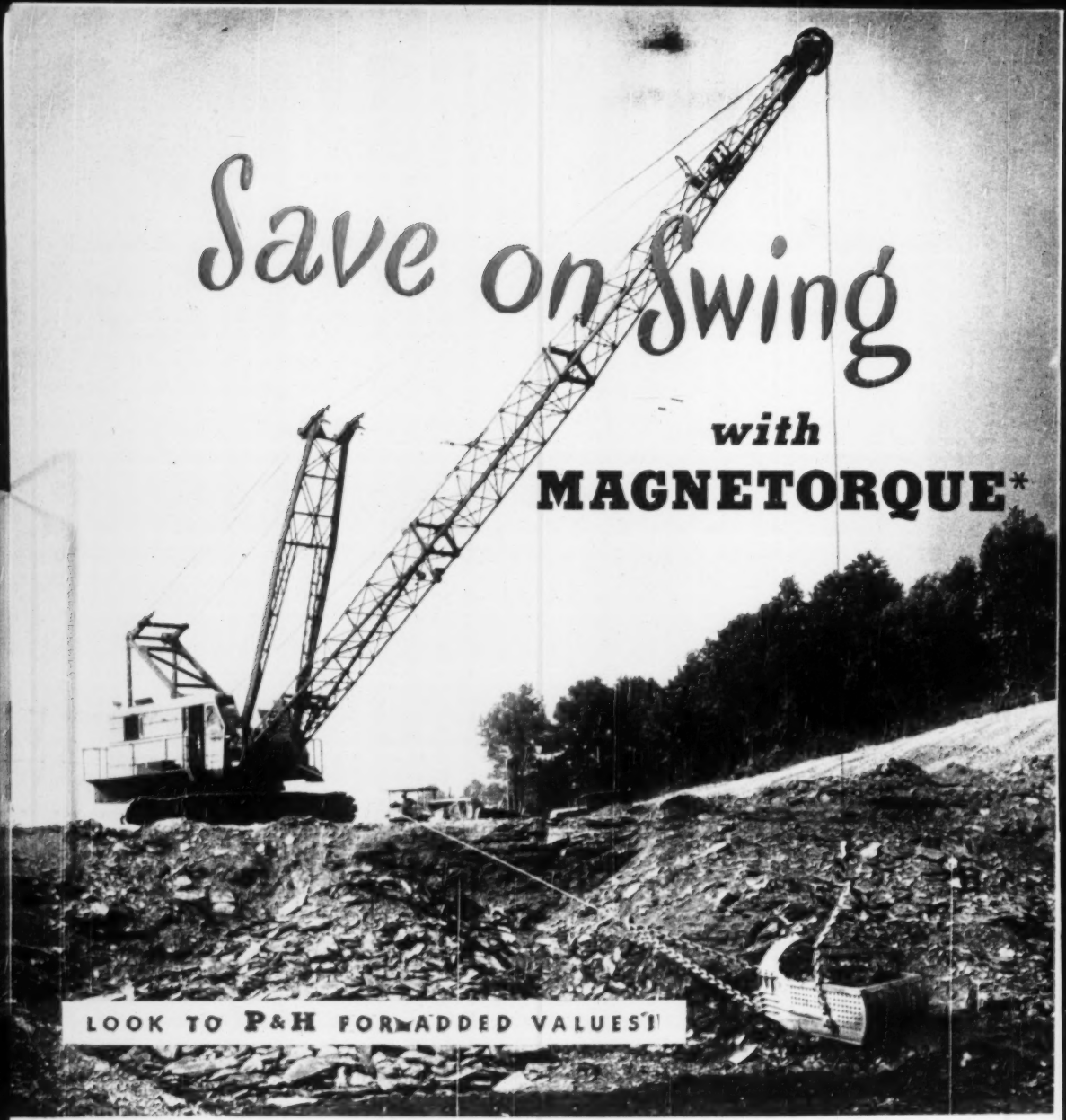

Faster digging cycle . . . up to 20 percent faster . . . is yours with the P&H Magnetorque* electric swing. Only Magnetorque can give you faster, smoother starts and stops that make this possible. It means greater production, lower cost, and more profits. You'll say it's the greatest advancement ever made on large draglines and shovels. You can say good-bye to swing friction troubles . . . once and for all. Power is transmitted electro-magnetically . . . there's no friction . . . there's no wear . . . and far less time-outs to rob production. The smooth operating Magnetorque lasts the life of the machine.

On all kinds of digging the Magnetorque can help you cut yardage costs. Magnetorque electric swing is standard on the P&H 1055 (3½ cu. yds.) and the new 955-A (2½ cu. yds.). Write today, for more information.

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$46,000 Saved in Carolina's Tallest Building!

Zonolite* Plaster Saves 2,600,000 lbs. Dead Weight

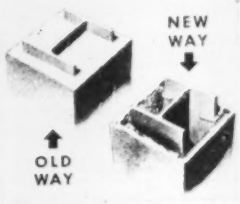
Every architect knows weight costs money. That's why so many hail lightweight Zonolite Vermiculite Aggregates for plaster and concrete.

The Cornell Arms Apartment building in Columbia, S. C., a 119-apartment, 18-story structure, has beams, girders, columns fireproofed with Zonolite plaster instead of heavy concrete. The saving in fireproofing materials for the beams and girders *alone* was $30,147! In addition, 200 tons of steel were eliminated due to the reduction of dead load, an additional saving of $16,000.

SAVES MATERIAL HANDLING TIME

Zonolite Vermiculite Plaster is only 1/3 the weight of plaster made with sand. It saves time in preparation and clean-up, helps avoid costly construction delays. In one recent multiple-story building, Zonolite plaster used throughout, was instrumental in saving 86 days in construction time.

Zonolite plaster has attained fire ratings up to four times as great as sand plaster. Send coupon today for summary of fire tests, and details of how Zonolite Vermiculite Aggregates can save time, money and critical materials on your next job.



New method of fireproofing structural steel with Zonolite plaster slashes costs, speeds construction, reduces steel requirements.

Hoisting time was reduced 87% in Wire Building, Washington, D. C., because Zonolite Plaster Aggregate was used instead of sand.

The Cornell Arms Apartments, $1,500,000 Columbia, S. C. building.
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Structural engineers: Johnson and Shand.
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Please send complete specification material on Zonolite Vermiculite Plaster, including summary of fire tests.

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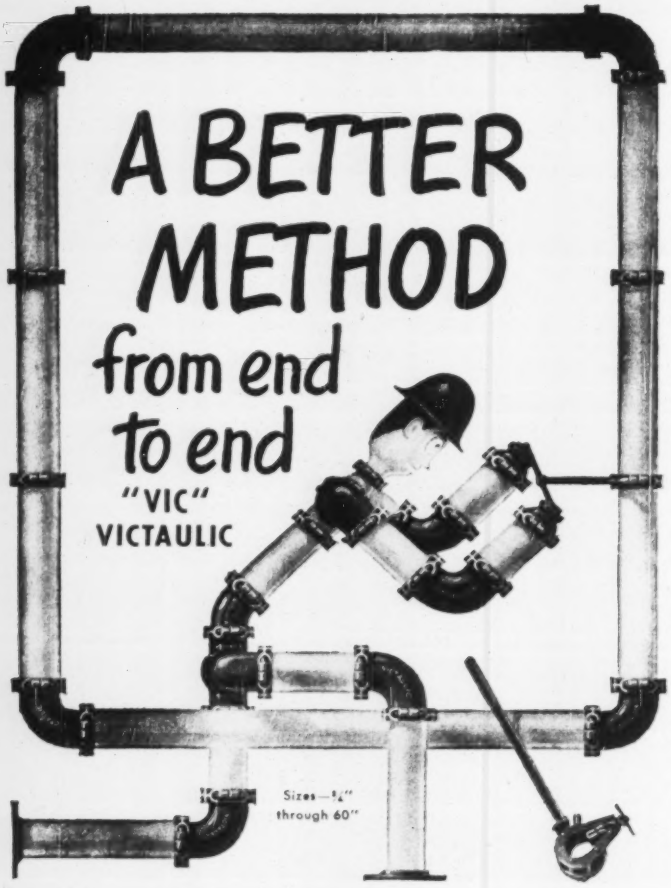
*Zonolite is a registered trade mark.



No matter how you look at it, VICTAULIC offers a method of piping that will save time, work, and dollars on construction and maintenance from one end of the line to the other.

The VICTAULIC METHOD is easy, quick, and sure. For joining those pipe ends—two bolts hook up Victaulic Couplings in a jiffy, a standard T-wrench is the only tool needed. AND Victaulic joints stay positive-locked, leak-proof . . . they stand up under extreme pressure, vacuum, or strain conditions!

Grooving those pipe ends is a cinch with the VICTAULIC METHOD . . . "Vic-Groover" grooves 'em automatically in half the time of a conventional pipe threader!

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You just can't beat the COMPLETE Victaulic System for efficient piping construction . . . it's the EASIEST WAY TO MAKE ENDS MEET.

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26TH VICTAULIC YEAR

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The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

(Continued from page 10)

of 0.006 to 0.249 in., with sawed, slit or sheared edges.

Plenty of Engineers, Too?—Brig. Gen. S. D. Sturgis, Missouri River District Engineer, told the Missouri Basin Inter-Agency Committee that he foresees no halt of Corps of Engineers work due to Korea. It's a limited war there, he said, and the Army has plenty of camps. Reclamation Commissioner Straus said his agency plans no cutbacks now, and indicated that power construction might be pushed.

Baby, It's Cold in There—A Los Angeles committee of heating and ventilating engineers says nearly half the FHA-insured homes in southern California are inadequately heated. And it recommends changes in FHA's existing heating code.

That's the Spirit—California's Highway Commission has added about $20,000,000 worth of work to its 1950-51 budget. Necessary funds are savings from low construction costs last year, and increased gasoline tax.

Back-to-School Note:—Virginia's school system now needs new buildings which would cost $80,000,000 to $100 million to build. It approved construction of more than $15,500,000 worth of schools in the year just ended and will seek a $10,000 program in the school year soon to start.

Big Job—Michigan's Mackinac Bridge Authority has named three engineers to report on feasibility, design and cost of a bridge across the Straits of Mackinac, separating the upper and lower peninsulas of Michigan. It's anticipated that a record-breaking, 4,600-ft suspension span would be needed. The water crossing is 4 mi wide, the water depth a maximum of 290 ft. Named to the panel are O. H. Ammann and D. B. Steinman, New York, and G. B. Woodruff, San Francisco.

Keep It Clean—Massachusetts' Gov. Paul Dever has signed a bill permitting the Boston Metropolitan District Commission to divert up to 15,000,000 gal of water daily from the Boston water system into the Charles River. Object is to prevent stagnation and pollution in low water periods.

Cloudy Future—California's Water Resources Board has ordered its legal staff to study possible licensing of rainmakers. It wants to encourage the responsible ones, discourage others. Above all, it doesn't want the new art to become a blue-sky proposition.

(Continued on page 17)

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contains no vinsol resin
not another admixture

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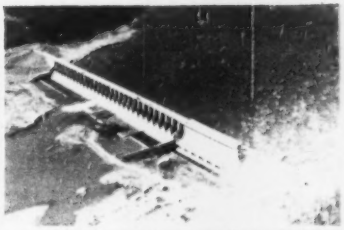
specifically formulated
for making air entrained concrete!



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West Virginia
Bluestone Dam
Georgia
Allatoona Dam
Kansas
Fall River Dam
Oklahoma
Fort Gibson Dam
Tennessee
Center Hill Dam
Vermont
Union Village Dam
Massachusetts
East Boston Express Highway
New York - New Jersey
George Washington Bridge
Illinois
Chain of Rocks Dam
Portugal
Barrage Hidro-Electrica do Cavado
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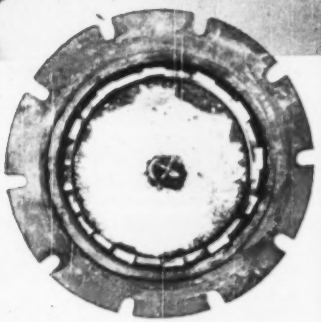
Lock Joint Pressure Pipe of any design may be tapped easily and economically for the purpose of establishing either large connections or small service outlets. With the aid of a few simple instructions, any experienced service crew can apply the modern tapping technique which permits the making of connections in concrete pressure pipe while the line continues to operate under pressure.

Although, for many years, taps have been made successfully in concrete pressure pipe, today's efficient equipment and modern methods now make it possible to tap Lock Joint Concrete Pressure Pipe with even greater economy of time, money and effort, and without sacrificing strength.

At your request we would be glad to send you our booklet outlining the simple steps required in making a pressure tap in Lock Joint Concrete Pressure Pipe.



LARGE PHOTO: Tapping a 16" outlet in a 36" pipe at Wayne County, Michigan.

SMALL PHOTO: The pilot drill of the tapping machine withdraws the concrete core, making a clean cut, and leaving no obstruction within the pipe line.

Lock Joint Pipe Company for over forty years has specialized exclusively in the manufacture of reinforced concrete pipe for water supply and transmission mains as well as for sewers, culverts and subaqueous installations.

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LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

(Continued from page 14)

Progress Report—Chemical process industries in the Los Angeles area have reduced their sulphur-dioxide emissions from 60 to 65% or from about 320 tons daily to 105. Overall, these emissions have been cut by 50%, the County Smog Control board announced.

For How Long?—Corps of Engineers' District Office at Honolulu is being dissolved, after 45 years. Its business will be conducted hereafter as an arch office of the San Francisco District. This follows dissolution of the Corps' former Western Ocean Division, made up of the Honolulu, Okinawa and Manila Districts.

Is That Tax Necessary?—Contractors in Sheridan, Wyo., henceforth will have to pay $15 for a license permitting them to do up to $10,000 worth of work in one year. Beyond that value, the tax will be one-tenth of one percent of the face amount of building permits in excess of $10,000. You can do your own work on your own premises free.

What's In a Wage?—Maryland's new Commission on Prevailing Wages has issued a series of determinations on pay scales, most of them affecting road work. About 50% of the rates prevailing wages below union scales, the commission's chairman asserted. In the Washington, D. C., area most wages were set at union levels. Constitutionality of the act has been challenged.

Cat-skinning Dept.—An Ohio Supreme Court ruling that the highway department can't hire outside consultants forces abandonment of a proposed contract between the department and Miami University covering a business survey of the department. So will a dozen students who were to do the work—not to be added to the department's payroll to do the job they were to do under contract.

Add Foreign Aid—Brazil seen by some as a very likely location for a new Korea, is to get U. S. financial assistance for its seven-year development program.—Export-Import Bank has promised to help finance projects which will build the country's production. Projects will be both public and private.

Capitalize It—Army Engineers and the Reclamation Bureau figure they averted damage of as much as $5 million during this season's Columbia River flood period by controlling flows at 13 USBR reservoirs in various river basins.

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Specified densities are quickly reached in granular soils with the Jackson Vibratory Soil Compactor. For those areas adjacent to structures, bridges, culverts, trenches, factory floors and earth fill dam construction there is nothing that begins to equal the Jackson Compactor for speed, convenience and thoroughness of compaction. Self-propelling, the operator merely guides it. Send us a sieve analysis or small sample of the soil and we will tell you what you can expect in percentage of A.A.S.H.O. densities and depth of compaction.

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and OTHER JOBS

CROWNS—(Any Type)—INVERTS—UNDERCUTS

With the Jackson electric Vibratory Hand Screed (powered by a Jackson 1.25 KVA Portable Power Plant) it is possible to eliminate center construction joints and pour full widths up to 30 ft. And it is the only screed that can be rolled back (on 4 rollers) for second passes. Screed is furnished with all hardware, cable, shoes, rollers and vibratory motor attached to an 8 ft. plank. The contractor has only to provide himself with a plank of suitable length, specified crown, and then transfer the hardware to be set for any particular use. Screed has strong tendency to propel itself forward and requires only two men on any width slab.

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The above equipment as well as many other time and money-saving Jackson vibrators are for sale or rent at your Jackson Distributor. See them there or write for handy "POCKET GUIDE" to the Jackson line.

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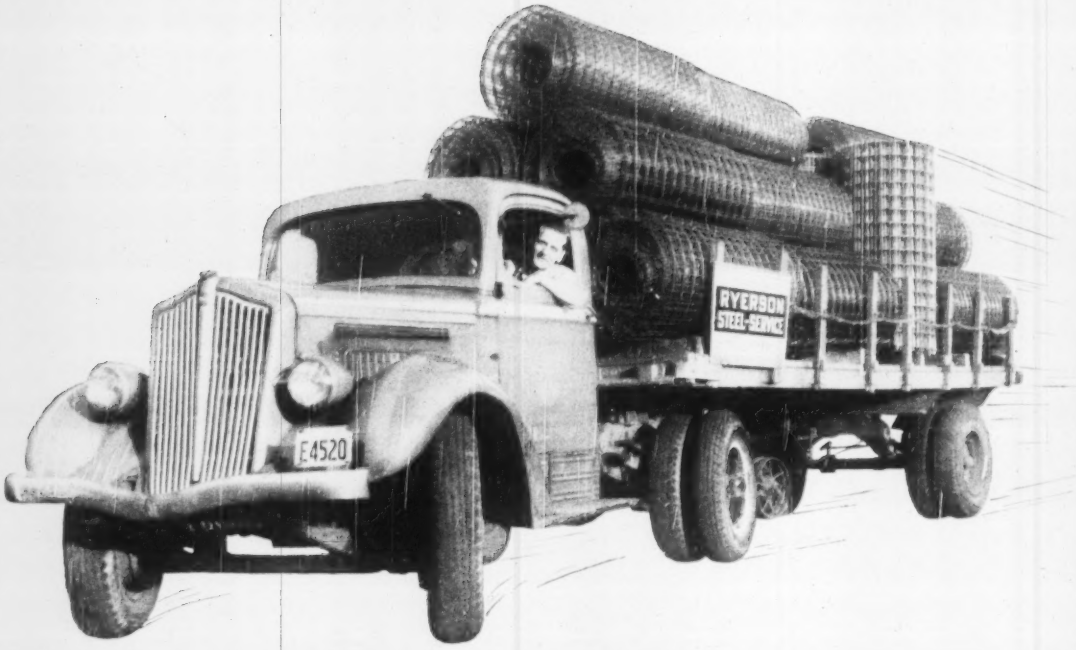

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These large, diversified stocks mean you can get fabric that exactly meets your job requirements. And Ryerson service also includes engineering help. We gladly recommend the correct size and gauge to give necessary strength at lowest cost.

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THE CONSTRUCTION WEEK

HOW GOES THE BATTLE?—Prime news for all segments of construction—aside from purely military matters—is the progress (or lack of it) in matters such as controls that will affect business. In capsule, here are Washington's best guesses for this week (there's more detail on some of them in pages following):

Housing—Credit restrictions on housing are expected to have little effect on construction during the remainder of 1950; government guesses now put the year's housing total at about 1,100,000 starts (instead of 1,250,000 anticipated with no controls, or 2,000,000, which was the first estimate after controls were applied.) First to be hit will be one-to-four-family class, since most of those already committed (before the credit freeze) will be finished in three months. But apartment builders are committed so far ahead that there's little liklihood of much cutback.

Manpower—Other than military calls (and the Seabees were still calling for volunteers to join reserve units) there were these developments: The Labor Department put out its first list of critical occupations (those most likely to get deferments). These included civil engineer, electrical engineer, sanitary engineer, geologist, riggers, maintenance mechanics, foremen (in critical occupations) and certain apprentices.

Top control—If the defense drive goes all-out, Washington is betting a new government super-agency will direct the civilian economy. The agency even has a name—National Mobilization Agency—and would combine all the powers of the myriad separate agencies set up in War II—including manpower and prices.

Taxes—Excess profits tax on this year's earnings isn't likely; but income taxes certainly will be boosted.

Economic Controls—Congress seems determined to vote a complete set of economic controls. There's plenty of politics in this—by giving Truman the powers but not specific instructions when to use them, Congress figures it can escape the onus of the controls themselves. Example: Truman asked power to allocate materials, give priority to defense needs, control credit; Congress is adding power to fix wages and prices, ration consumer goods—discretionary with Mr. Truman.

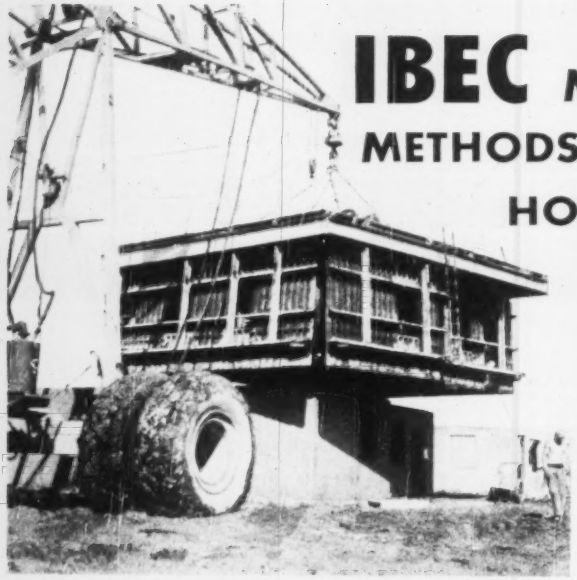
Ceilings—Inventory ceilings will come perhaps within a matter of weeks, to limit holdings by manufacturers, distributors and retailers; selective price ceilings are also likely—they make a good club over basic materials such as steel. There's not much chance of wage and salary ceilings, right away.

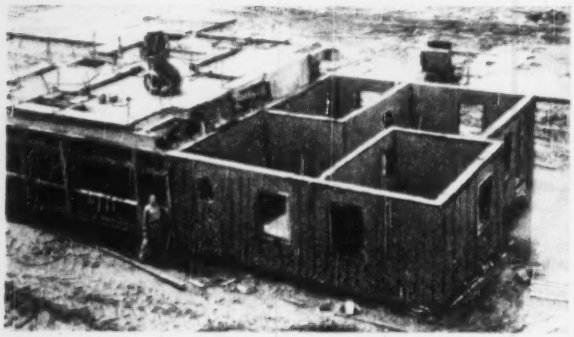
UPS AND DOWNS—Some of the half-war's effects on construction were discernible in scattered spots last week. While the Studebaker Corporation stopped work on a $5,500,000 passenger car assembly plant at North Brunswick Township, N. J. (owing to "doubt as to availability of materials"), Chrysler Corp. announced plans for construction of a huge plant on a 105-acre tract in Indianapolis (the plant "could easily be converted to war work" said officials). And at Palo Alto, Calif., W. E. Waste, vice president of Bechtel Corp., told an annual business conference that 10% of peacetime construction would go into war requirements in 90 days, and 25% might go that way by the end of the year.

NO PREFERENCE—The National Association of Home Builders set out to scotch what it called persistent rumors that government-insured construction would have a preferred position in securing critical building materials. Not so, said NAHB, and pointed to the famous April, 1942, freeze order (L-41) which gave no preferences that way. NAHB also took occasion to warn its members against panic buying and hoarding. "That can only bring controls and price fixing," it cautioned.

"IN THIS CORNER—"—Ohio may get a decision soon in the running fight between its Highway Director, T. J. Kauer, and its auditor, Joseph T. Ferguson. The two, both Democrats, have been feuding over certain state road financing problems, (ENR Aug. 10, p 25) and each holds one legal decision over the other. The rubber match is on with Kauer's announcement that, if necessary, he will ask the state attorney general to sue Ferguson for contempt of a state Supreme Court order validating the use of highway department funds for the Ohio Turnpike. (Ferguson argues that the decision doesn't mean he has to pay outsiders who do Turnpike Commission work. He's opposed to use of non-departmental personnel on departmental work.) Ferguson said he'd decide this week whether to honor vouchers for highway employes who have done turnpike work. Kauer says Ferguson's stand imperils the entire Turnpike program. Still at issue is whether the funds can be used to pay consultants for work already done on the toll road surveys.

IBEC MASS-PRODUCTION METHODS ACHIEVE NOTABLE HOUSING ECONOMIES





● Imagination and know-how, working with good concrete, have achieved another notable advance. Utilizing what in essence is a mobile production line on the job site, the Ibec Method produces attractive, all-concrete homes, at costs which revalue the home-building dollar.

Heart of the Ibec Method is a 25-ton form used for both exterior and interior walls. A 50-ton crane positions the form on a cast-in-place floor slab. Roof slabs, precast on the ground in tiers, are placed on the house by Billner vacuum lifting device. Monolithic concrete walls in a single operation . . . no shoring, scaffolding, ladders . . . completing in hours what normally takes days.

Recent example is Marshall Manor, a 204-unit, low-cost housing project at Norfolk, Va., where attractive, fire-safe homes, built with Lone Star Cement and lightweight, insulating aggregates, rent for only $45. a month.

Here is Gibraltar-like, all-concrete construction—impervious to fire, termites, weather, wear. Adaptable to any good architectural design, the Ibec Method stretches the building dollar in the home-owner's favor.

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Construction Method developed by
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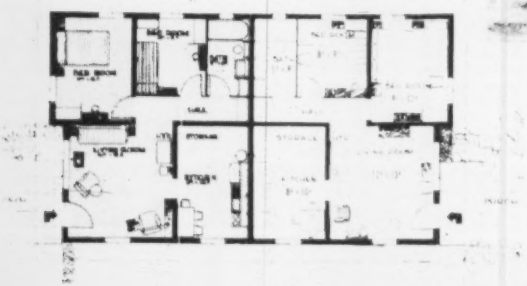
Affiliate of **INTERNATIONAL BASIC ECONOMY CORP.,**
New York
Built with Lone Star Ready-Mix Concrete from
SOUTHERN MATERIALS CO., INC., Norfolk—Richmond



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CONSTRUCTION TRENDS

WHICH WAY STATE AND LOCAL CONSTRUCTION?

In the months ahead, the job of assigning priorities to construction work will be one of government's knottiest problems.

And public works programs will call for some of the toughest decisions. Strangely enough, the federal agencies will have easier problems than will many state and local governments when it comes to making decisions on what's to go.

Congress and the Administration will set a general policy for the federal program. The agencies will measure their own projects against it and cut back those which are least essential to the war effort. That will call for some tough decisions, particularly on power programs and highways.

But local governments have been operating under sharp restrictions for almost all of the last 20 years. World War II, or limits on financing, have held back even some of their most urgent construction projects. Meanwhile, rapidly-growing populations and surging homebuilding have accentuated needs for new sewer and water systems, hospitals, highways and other construction.

Today—with the prospects that construction programs must be again restricted by materials shortages for an indefinite period—states and municipalities will have some hard decisions to make. For many towns, for example, it will be a choice between long-needed schools or a hospital. Or between a new sewage plant and highways to relieve traffic congestion.

How will these decisions go?

One way to get an indication is to look at what has been happening to state and local construction. The trends are somewhat surprising—as the following table demonstrates:

STATE AND LOCAL CONSTRUCTION EXPENDITURES

(By types as percentages of the total)

	1945	1946	1947	1948	1949
TOTAL	100%	100%	100%	100%	100%
Residential	6	6	4	5	6
Nonresidential	19	18	19	32	46
Highways	57	51	48	40	33
Sewer & Water	13	17	17	17	13
All Other	5	8	12	6	6

SOURCE: Department of Commerce and Labor

But the trends are a fairly good clue as to what states and municipalities will concentrate on when materials are restricted. In a very real sense, these governments haven't been able to do all the work they wanted to because of limitations on their financing. So the things which have been getting priority will generally continue to get it in the future.

It is a case of meeting the greatest needs first—whether construction is limited by finances or restrictions on materials. And, in general, war needs—for construction directly related to the war—will affect only a relatively small part of the state and local work. The bulk of the direct war construction will be done by the federal government, as it was during the recent war.

Standing out in the table is the fact that other kinds of construction have gone ahead faster than have highways.

The amount of money spent by state and local governments on highway work multiplied four-fold between 1945 and 1949. But total expenditures of these governments have multiplied almost seven times—from $534 million in 1945 to $3.6 billion in 1949.

The result is that the share of the local construction dollar going to highways, dropped from 57 cents in 1945 to 33 cents in 1949.

The greatest increase has come in nonresidential buildings, which include schools and hospitals.

This marked shift has come in spite of the fact that there are large federal-aid funds for highway work, and some for local hospitals, but none at all for schools, sewer construction, and water facilities.

FINANCING PROSPECTS

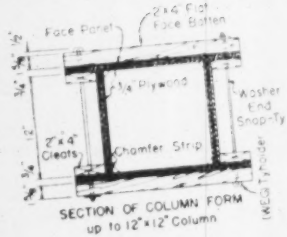
How does the U. S. partial mobilization affect prospects for financing state and local construction?

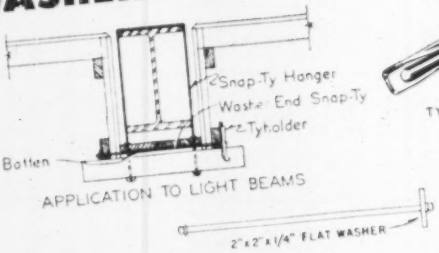
First reaction in financial markets sharply strengthened the municipal bond market. Investors faced with the prospect of a sharp rise in income taxes rushed to buy the tax-exempt state and local bonds. In short, they saw again something of the World War II pattern. There, high personal income and corporation taxes markedly reduced investors' returns from corporate bonds and stocks and made tax-exempts very attractive.

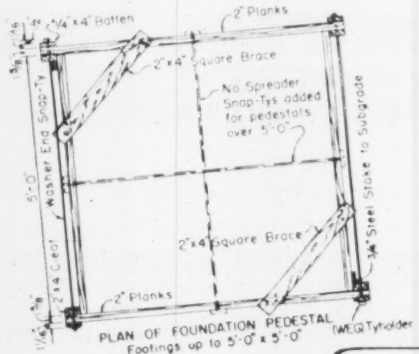
The pattern won't be quite the same as in World War II, however. There restrictions on materials cut state and local construction down to a very low level. With no construction to do, municipalities issued no new bonds. So, with the supply limited and demand heavy, prices of outstanding bonds were bid up. That, in turn, cut down their yields to investors to an all time low.

Now, however, some state and local construction will continue. There will be a continuing, although reduced, flow of new bond issues. With rising federal taxes making them more attractive, the new issues will be able to anticipate unusually favorable marketing conditions.

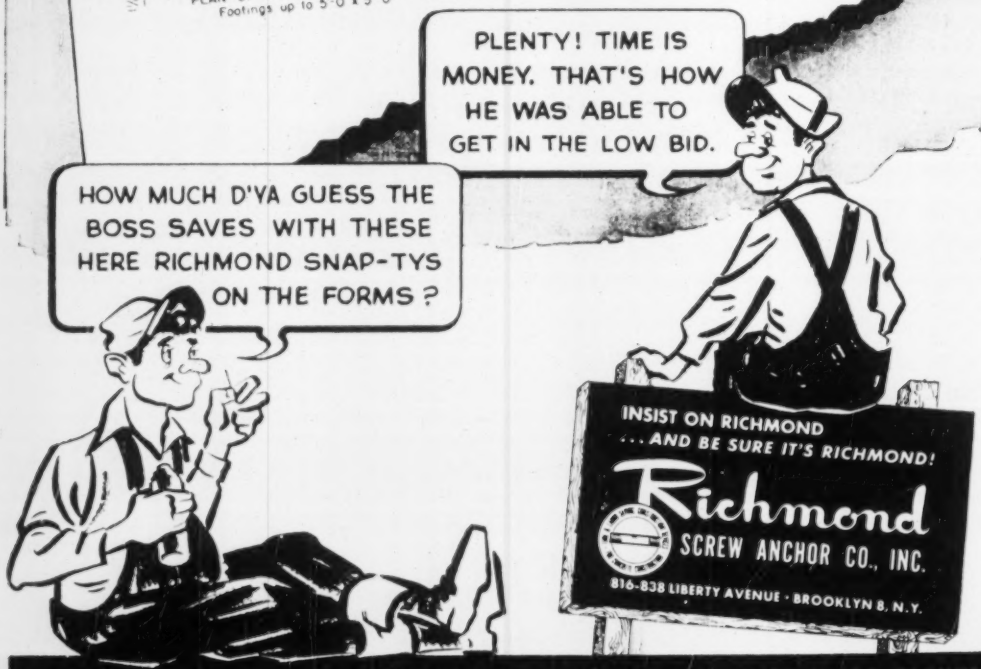
RICHMOND WASHER END SNAP-TY







Widely used as an external tie for light column or low heavy pedestal forms, this Richmond Snap-Ty has a ¼" x 2" x 2" flat washer against the head washer at one end. It speeds both form erection, stripping, and effects a substantial additional saving in lumber and nails. Richmond's Technical Department will prepare blueprints for you without charge showing how you can use this cost-cutting Snap-Ty on your jobs.


PLENTY! TIME IS MONEY. THAT'S HOW HE WAS ABLE TO GET IN THE LOW BID.
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RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING

Garages or Bomb Shelters?

MANY CITIES are seriously concerned at present over the problem of protecting their inhabitants against enemy air attacks and are considering construction of bomb shelters. Some propose to start building them right now.

The advisability of building shelters at this time is a question on which city officials would appear to be justified in looking to the federal government for recommendations and possibly for financial assistance. This consideration, however, should not put a stop to preliminary planning for such shelters.

Such planning should not be directed toward getting federal money for building underground parking garages or subways, which could be used temporarily as bomb shelters, as some have proposed (see p. 29). Shelters should be located where they provide the greatest protection—not necessarily where garages would be most helpful.

A report on the effect of atomic weapons just issued indicates that more protection can be provided than many had thought possible, also that it may take quite different form from that provided in World War II.

Collective Bargaining by Engineers

ENGINEERS to whom collective bargaining is a hard fact rather than an abstract theory will find little solace in the statement of principles on collective bargaining adopted by the Board of Directors of the National Society of Professional Engineers at the society's recent annual meeting in Boston. (This statement was published in the Aug 10 issue of ENR, p 29, at the request of the NSPE, which is seeking widespread discussion.) To these men, whom the NSPE board should be striving to help, it must appear that the board is trying to turn the clock back 15 years.

Although collective bargaining has been the legally established way for employees to settle issues relating to pay and working conditions since 1935, the first of the NSPE statements declares that "it is definitely unprofessional for a professional engineer, professionally employed, voluntarily to join a heterogeneous labor union, dominated by, or obligated to non-professional groups." And the second statement adds that "organizations of professional engineers for collective bargaining in any form are to be deplored, although their existence, for the present may be condoned under circumstances." Each statement is qualified by a long footnote.

There is no need to review here the factors that may make voluntary participation by engineers in collective bargaining desirable as a means for protecting their professional position; nor is there need to demonstrate that collective bargaining can be conducted and is being conducted in an honorable manner. It does, however, appear desirable to point to two very serious aspects of the NSPE boards action that, presumably, have been overlooked by the board.

The obvious purpose of the NSPE statement is to discourage collective bargaining by registered professional engineers and by the young engineers who aspire to registration. After saying that organizations of professional engineers for collective bargaining in any form are to be deplored, the board goes on to make the following pronouncement: "When employers generally are persuaded that professional employees must be viewed as individuals and not in groups or classes, then NSPE may condemn collective bargaining by professional engineers without qualification. In the meantime, we advise the young engineer that the existence of collective bargaining by professional engineers in an industry jeopardizes his professional status."

In view of the facts that some of the principal officers of the NSPE are employers of engineers, is it not possible that the National Labor Relations Board may look upon this NSPE statement as a thinly veiled attempt to prevent young engineers from bargaining collectively with their employers? And is it not possible also that the first part of the quoted statement may develop into an aid to industrial corporations in the exploitation of engineers, about which so much is being said these days in NSPE circles? Industrialists who seek to exploit young engineers do not need to be "persuaded that professional employees must be viewed as individuals." They only hope that the day will never come when they will have to deal with professional engineers collectively! The NSPE "principles regarding collective bargaining" stand as a strong bulwark to that hope.

For these reasons, if for no others, early reconsideration by the NSPE board of its statement appears necessary.

Roads and Preparedness

AS THIS ISSUE goes to press the Bureau of Public Roads is actively engaged in preparing a report to the President on what part of the current large road-building program should be continued as necessary to the nation's military preparedness program. It will be based on similar reports from the state highway departments.

The need for such a quick review of the nation's road program in the light of changed world conditions is obvious. Also obvious to all who use our highways is the conclusion that no unnecessary curtailment of highway construction should be made in a hasty or ill-considered attempt to aid the preparedness program. Hence the importance of developing a program that will permit the maximum amount of essential work to go forward without obstructing the military program.

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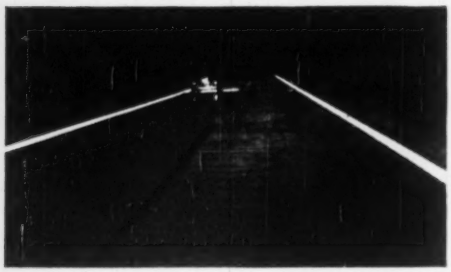
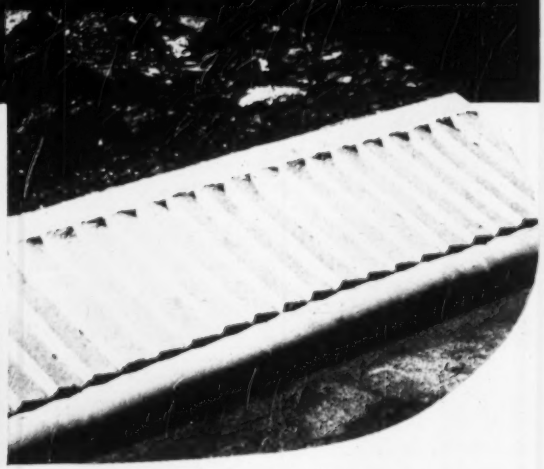


ON WET NIGHTS, when good visibility is needed most, the wet faces of the curb become even more mirror-like, safely guide drivers along the highway.



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ENGINEERING NEWS-RECORD

AUGUST 17, 1950 VOL. 145 NO. 7

Military services uncertain about manpower needs

Heavy construction specialists needed as officers and in enlisted ranks—Engineer Corps may double size within six to eight months—Services set deferment policies

Company grade officers in the Corps of Engineers—along with infantry and medical officers—are the most urgently needed group in the expanding Army. The most urgently needed enlisted reservists include specialists in bridge, road, beach, port and airfield construction, in landing craft operation and camouflage.

These are among the few facts that can be gleaned from military sources regarding manpower plans. Even as the second month of shooting war in Korea was closing this week, the military couldn't—or wouldn't—give any information that would constitute a tangible base for construction planning.

• **Enlisted reserves thin.** Expansion of engineer units stood to strike at the construction industry from top to bottom as well as the engineering firms that serve it. There was a real prospect that the Corps of Engineers' strength might double within the next six to eight months. This expansion would come from:

1. A pool of 20,000 engineer officers in the active reserve.

2. For enlisted men, sources other than the reserve.

The Army has 50,000 men in the Engineers' enlisted reserve. But most of them are in organized and individual organizations. These men will be ordered up only by units, not individually. And while there's been some mobilization of such units, the processments taking an entire unit rather than individual "specialists" who may be urgently needed. Therefore, it isn't always the answer.

• **Navy calls selective.** Navy calls for reservists are, where possible, to avoid calling up organized units. These calls are filled, where possible, from the unorganized reserve, on the basis that these men are best qualified. Volunteer reservists are called only as needed to fill quotas.

Specifically in the construction field, the Navy's Civil Engineer Corps is attempting to recruit 25,000 construction men over draft age for its Seabee reserves. Age limits are 26 to 44, with men enlisted at grades based on their experience. There are no meetings, drills or pay. Veterans above these limits may enlist, with still higher age limits for men with Navy experience. Contractors have been asked to assist in this drive. (see p 19).

In the Navy's organized reserve are more than 25,000 officers and 160,000 enlisted men. Its inactive reserve lists more than 250,000 officers and 650,000 men. Reservists may volunteer for a minimum period of one year.

During War II, the Civil Engineer Corps and Seabees had 10,000 officers and 247,000 enlisted men. Before Korea, it was down to 500 officers and 5,000 men.

• **Marines all out.** The Korean war, being one for which such a group as the Marine Corps is designed, it has gone farther and faster in its mobilization than any other service. All reserve ground units were called promptly, along with a number of air units. More of the latter are being called. It has also called its 80,000 officers and men in the volunteer reserve. The first 50,000 began reporting this week and will be in by Oct. 31. The remainder won't be far behind. That will bring the Corps strength to 200,000.

Army and Air Force reserve officers may return to duty at the reserve grade they now hold, whether ordered or voluntarily. Enlisted reservists likewise are recalled at present grades. The Army is accepting voluntary enlistment applications from reserve officers for one-, two- or three-year terms. Enlisted men are taken voluntarily for 21 months.

• **Air Force standards.** In the Air Force, reserve officers and airmen as well as former enlisted men with special skills will volunteer for one year. Officer requirements principally are in the ranks of captain or below. The Air Force has called about 8,000 officers and 42,000 enlisted reserves to be on duty early this fall. It had 250,000 officers and 125,000 enlisted men in reserves before Korea.

Continued on page 26

How military reserves are organized

To assist you in reviewing the habits of your employees for military call as reservists (either officers or enlisted men), here's a quick run-down of reserve classifications in the three major armed services:

1. The Organized Reserve. In all three services, these are men who have joined units that are fully organized insofar as staff is concerned and need only filling out with the required number of men to form ready units. These reservists attend regular meetings (usually twice a month), spend two weeks on active duty each year, and are paid for their participation.

2. The Volunteer Reserve. This category is divided into two parts—active and inactive. The active parts consist of reservists who are assigned to Voluntary Reserve squadrons or training centers (mixture units which are organized for administration and training only, without regard to regular and complete staff organizations). These units meet regularly for training, but their members are not paid and put in no active-duty training.

The inactive part consists mostly of officers but also of some enlisted men, who accepted reserve appointments, but who are not assigned to any particular unit. These men must have, however, shown some evidence of interest, through occasional attendance at meetings, taking correspondence courses, etc.

3. The Inactive Reserve. This section, in all three services, is filled. It consists of men who have done nothing at all about their status since leaving the services, but who are still legally available due to provisions of the law.

4. The Honorary Reserve. This consists of officers and enlisted men who have been retired for age or physical disabilities. In this category the Navy includes its Fleet Reserve—staffed by enlisted personnel who have dropped out of the service after their enlistments terminated. Men in this class cannot be called to active service without their consent.

(Continued from page 25)

The Army, last spring, had about 200,000 officers and 500,000 men in its reserves, both organized and volunteer.

Last week, it began the recall of about 8,000 company-grade officers and organized units. And it has ordered 62,000 of the 1st 300,000 enlisted reserves and unorganized units to report for duty during September and October for 21 months.

During War II, the Corps of Engineers reached a peak strength of 750,000 officers and men. It reached that level after starting with less than 10% of that number—70,000 officers and men. At the moment, the Corps isn't likely to face a comparable expansion.

All told, the armed services are scheduled to grow to 3,000,000 men in next June.

• **Delay possible.** The Department of Defense memorandum announced an overall policy that will permit delays averaging 30 days, but up to as much as six months, for reservists ordered to active duty.

The department said these six categories would be eligible for "recall delay":

1. Individuals enrolled in educational institutions; 2. Individuals engaged in research and scientific activities; 3. Students of professional graduate courses in dental, medical or veterinary colleges, or in their first year of medical internship; 4. Individuals engaged in certain critical civilian occupations or essential activities of such as identified by the Department of Commerce and Labor; 5. Hardship and dependency cases; 6. Key managerial personnel whose recall would cause material loss in production, services or research necessary to the national interest.

In all instances where delay is sought, the department said that it is essential that the individual concerned produce a statement from his employer or school office testifying to his scholastic or occupational status.

Procedure is: The individual must forward his request for delay to the service headquarters to which he is assigned.

If more than 30 days delay is considered necessary, the individual must forward a written request with supporting data from his employers to support the request.

If the case is clear-cut, the individual will be authorized the delay as soon as possible. If the case cannot be decided on the merits of the request alone, the individual may be required to appear before a board.

No "blanket" deferments will be made.

Maryland test pits trucks against roads

States and federal government conduct six-month experiment to get scientific data on truck-weight effect on roads

Probably the fastest, certainly the most unorthodox scheduled trucking going on in the United States today is taking 28 drivers up and down 1.1 mi of track at U.S. Route 301, in southern Maryland near Bel Alton.

It's part of Road Test One, a cooperative venture in which eleven states and several federal agencies are attempting to get some facts on a class American allegation: Three big trucks are ruining the roads. Test driving began in June. ENR April 20, p 26. It's supposed to end in December.

• **Eight trucks.** Trucks are loaded with concrete blocks to these weights: 15,000 and 22,400 lb for single rear axle trucks and 32,000 and 44,800 lb for tandem rear axle trucks. The high weights divided so that each truck has a half mile date. Each of the two trucks in each class and they operate at one minute overlapping intervals over their respective strips, 24 hours a day, 7 days a week.

As cracks appear, they're painted yellow. Cracks in the mid before the test were painted black. Instruments record all the data such as changes in surface elevation, deflection under wheel load, and stress in the pavement. As finished, the state should have more than 500,000 axle truck passes (about 250,000 truck passes).

The government's contractor for the test is the Bureau of Public Roads. Cooperating states are Maryland, Virginia, Delaware, New Jersey, Pennsylvania, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire and Vermont.

Military lumber needs set at 1.5 billion bd ft

To dispel scare stories that have been shooting lumber prices upward, Maj. Gen. Lewis A. Pick, Chief of Army Engineers, announced last week that all foreseeable purchases for the entire military establishment won't exceed 1.5 billion board feet in the fiscal year ending June 30, 1951. Under the unification setup of the Defense Department, the Corps of Engineers buys all lumber for the Army, Navy and Air Force.

General Pick made the announcement after a procurement meeting in the Pentagon with representatives of half a dozen industries. Rumors that the Defense Department would stockpile 6 billion board feet had pumped lumber prices in recent weeks—as shown by a rise from $55 to $105 per M ft for No. 2 common in 35 days at the Atlanta Procurement Center. The lumber spokesman at the Pentagon meeting said there is no existing shortage in the lumber market, asserted that price jumps are purely psychological.

Military needs foreseen by General Pick would take about 4% of a year's lumber production. During the six months ending June 30, production totaled 18.3 billion board feet. For the calendar year 1950, output is expected to total 35 to 37 billion feet.

Texas studies war clause for highway contracts

Texas' attorney general is studying the legality of war clauses in contracts let by the state's highway department.

The highway commission is considering their use because of the unsettled construction picture resulting from the Korean war mobilization. During the last war, some contractors were unable to fulfill commitments because of material shortages.

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dicating that it is better than average.

Traffic normally using this part of the highway has been diverted to a parallel road.

• **Highway Research Board.** This test is being conducted by the Highway Research Board with funds supplied by eleven states and the District of Columbia. Field personnel and instruments are supplied by the Bureau of Public Roads, which also is making the surveys and soil tests.

One of the brighter angles for the observer is that he isn't paying for the trucks and their load. They're being loaned by manufacturers. Oil may be donated through the courtesy of the petroleum industry.

New Tax Court rule eases old problem

If a firm doing business abroad can't eliminate losses on currency conversion, at least it may deduct the losses from other profits.

That's the substance of a decision by the U. S. Tax Court.

• **Rate of exchange varied**—The case involved a contractor engaged in construction and general engineering work in the U. S. and abroad. Years ago, he contracted with a Peruvian corporation to build a country club near Lima. When work stopped, the corporation owed the contractor 1,536,000 Peruvian soles. At the rate of exchange in effect at the time—2.5 soles to the U. S. dollar—that was $734,000. Under U. S. law, the contractor had to report this as income.

But the contractor had trouble collecting. Finally, the corporation did pay up 1,642,000 soles—but when it did, the conversion rate was much less favorable. He realized only $281,000.

The contractor ran into similar troubles on a school-building job he undertook for the Chilean government. Before work started, Chile had agreed to make all payments in pesos with a guaranteed exchange value of slightly more than 12 cents per peso.

• **It kept happening**—When Chile defaulted on installment payments, the contract terminated, with the government owing more than 8,000,000 pesos. In dollars, that came to about $711,000, again income for U. S. tax purposes. The contractor never collected the full amount of pesos. And what he did collect was convertible at a far less favorable rate than had been promised. So he realized less than $200,000.

In filing its tax returns, the contractor tried to offset these losses by:

1. Deducting the dollar difference between what would have been realized had both contracteer paid up promptly and what was later obtained at depreciated rates.

2. Treating the loss as ordinary, rather than as a long-term capital loss, limited in the tax savings to 25% of the face amount of the loss.

3. Carrying over the loss to wash out taxable profits of later years.

• **BIR disallowed it**—The Bureau of Internal Revenue refused to allow the bulk of these loss claims, told the contractor that tax was due on the nominal amounts owing at the time work ceased. BIR reasoned that, since the bulk of the debts actually was paid, though in local currency, there was no operating loss. Any loss was kind of speculative die to a change in value of the asset held; therefore it was a long-term capital loss and not subject to a carryover.

The Tax Court ruled in favor of the contractor. Reason: The contractor was not in the foreign exchange business; he didn't hold currency received but converted always at the first opportunity. The losses were incurred in the course of carrying on his usual business. Therefore, the tax consequences—and the losses—could be handled in the usual way.

EAST MEETS WEST—Korean labor, mostly farmers recruited by South Korean police, answer roll call at an air strip in Southeast Korea. They helped engineer troops build roads and taxiways and lay a pierced-steel plank extension to an old Japanese strip.

Steel and men scarce but strip's ok

(As ENR went to press, the Air Force had abandoned a strip believed to be this. The Army held the strip. Reds were within artillery range.)

A. W. Jessup
McGraw-Hill World News

AN AMERICAN AIR FORCE BASE IN SOUTHERN KOREA (McGraw-Hill World News)—American aviation engineers of the 20th Air Force have transformed this abandoned Japanese air strip into a combat fighter base for F-51s. It's been a patch-work job, nothing to be compared with the construction of the great bomber and fighter strips during World War II.

When the Air Force first flew in July 12, there was nothing here but a gravel covered, 4,500-ft concrete strip surrounded by fields of beans and weeds. The next morning, a company of engineers arrived by LST. Working 24 hours a day, they cleared off the strip, built a 500-ft overrun with pierced steel plank, so that the F-51s were operating against the enemy on July 15.

By July 18, they had completed a 40-ft wide taxiway around one side of the strip with parking ramps for the aircraft. All were constructed of pierced steel plank.

The Air Force would like to put in a new, major strip for the use of F-80 jet fighters in southern Korea. But there isn't enough steel plank or enough engineers to do the job—yet.

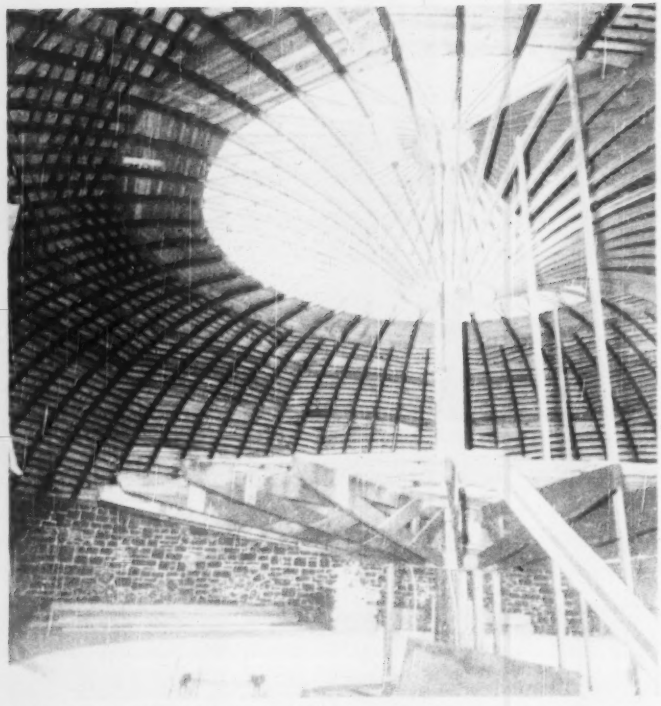
Like every other phase of the Korean war, the engineers started out with too little of everything. The colonel who came in here to supervise this job says he is a group commander, but "I have only one company plus a platoon."

Another advanced fighter and transport base further inland is scheduled to be rebuilt with pierced steel plank, when and if the plank and engineers arrive. This strip was grass, but now is just dust or—when it rains—mud.

At the major F-80 base in Japan, from which the majority of fighter cories have been flown against the Communist armies, the condition of the runway has seriously limited combat effectiveness of the aircraft. The strip is macadam, which is so soft in the summer heat that F-80s landing at 120 miles per hour seldom have to be braked to bring them to a halt.

On takeoff, the F-80 has only been able to carry two 5-in. rockets instead of the full load of eight. Even then, pilots have had to raise their landing gears in order to get airborne. With 7,000 ft of concrete, there would be "no sweat" taking a full load to the enemy.

Another drawback of macadam for jet aircraft is the effect of JP jet fuel on macadam. It eats into the surface, making it soft and spongy.



LIKE AN UMBRELLA—Arched steel ribs springing from a central mast support the roof of a circular house under construction in Aurora, Ill. On one level in the interior is the kitchen and dining area; around it, on a higher level, is a 10½-ft wide combination living room and art gallery. A circular platform halfway up the mast under a glass dome is a studio. Bedrooms and baths will be in two wings at opposite sides of the round structure, which measures 50 ft in diameter and 25 ft from the radiant-heated concrete floor to dome. Walls are made of canuel coal colored with chunks of blue-green glass and marbles. The roof is covered with raked cedar shingles. Cost of house alone, which provides about 2,500 sq ft of floor area, is $42,000. It was designed by Bruce Goff, University of Oklahoma, and is being built by Don Tosi, of Maywood, Ill., for A. G. Ford. (Acme Photo)

Canadian, Alaskan hydro plans OK'd

In Canada and Alaska, two significant new hydroelectric developments were in prospect this week.

Largest is the 440,000 hp project on Quebec which will be undertaken this fall by the Aluminum Company of Canada. It's to be in the Lake St. John district of Quebec, center of the company's operations. Power will be developed from the falls on the Peribonka River at Chute du Diable.

• **Plans under study.** Detailed plans for the $52,000,000 development are now under study by the Quebec Department of Hydraulic Resources. It's estimated that 2 years more would be required for the construction. Energy would be available not only for Alcan use but to assist rehabilitation of the Chibougamau mining area, now under active development.

The Peribonka flows into Lake St. John from the northeast. Plans in effect, it forms part of the main tributaries of the Saguenay River, which flows from the lake to the St. Lawrence River. The 1,200,000 hp Shipshaw development of Alcan is on the Saguenay.

• **Alaska's first.** In Alaska, the first large-scale hydroelectric project will be undertaken by the Interior Department's Bureau of Reclamation. The $20,000,000 development will be in the Matanuska Valley, the Territory's most productive agricultural region.

USBR expects to call for bids next February or March, according to J. M. Morgan, chief of its Alaska Division. The bureau must first acquire title to the 2,500-kw plant on the Eklutna owned by the city of Anchorage.

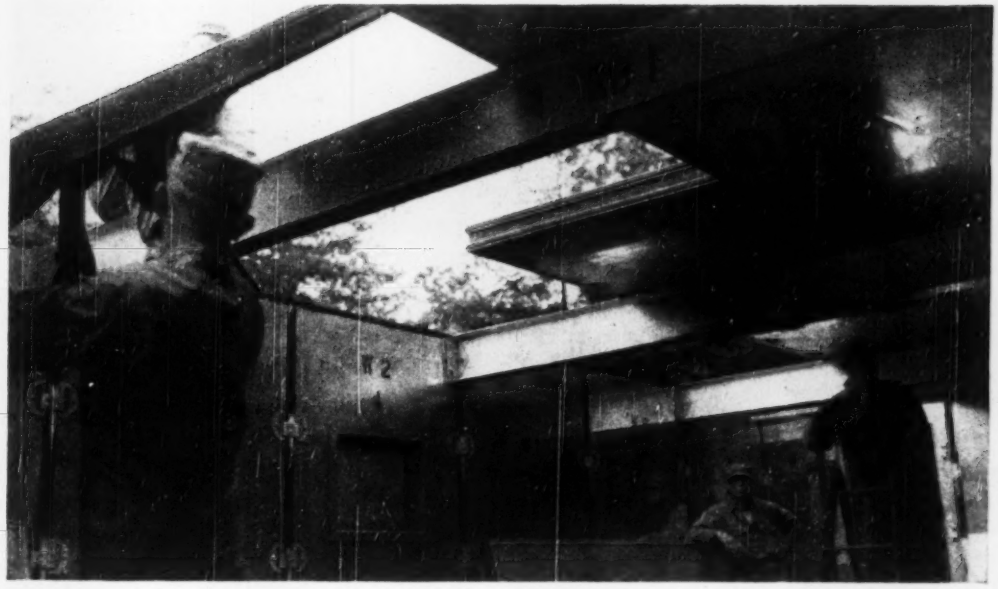
The new project will take about five years to complete. It will operate ultimately in a system which will include a steam-electric plant to be built by the Alaska Railroad and the Chugach Electrical Association. This will "firm" the secondary output at the Eklutna Lake plant.

Plans call for tapping Eklutna Lake, a natural reservoir 7 mi long, 1 mi wide with a maximum depth of 200 ft, which is more than 800 ft above sea level. A 9-ft dia tunnel 4½ mi long would extend through Goat Mountain to the coast. There, a 90-ft high concrete surge tank would be erected, and a steel penstock of 7½-ft dia would carry the water 1,250 ft down a mountain to the power plant at tidewater. Wood-pole transmission lines would carry the 100 million kwh of firm output and 40,000,000 kwh of secondary energy up and down the coast to Anchorage and to within 4 mi of Palmer, in the Matanuska Valley.

The Anchorage plant, purchased from private owners in 1940, was designed to serve a population of 3,500 people. It's now attempting to serve 20,000, and more than 5,000 more residents beyond the city limits are without service. In the city, circuits are secured at various parts of the city at staggered intervals—darkening one section so that another may be served. USBR will give preference to public bodies in selling its energy.

• **Big Quebec program.** Meanwhile, the Aset Peribonka project is only part of an extensive hydro development program in Quebec. Provincial Premier Duplessis said that since 1945, his government has approved plans for development of more than 1,000,000 hp, most of which projects are under way. These include a 600,000 hp addition to the Beauharnois plant on the St. Lawrence; two new Shawinigan Water and Power Co. projects on the St. Maurice River; and small extensions by the Gatineau Power Co., in the Ottawa Valley.

And in Ottawa, Chairman R. M. Saunders, of the Ontario Hydro Electric Power Commission, says investigations are underway of the possibility of developing additional power at Chaudiere Falls, on the Ottawa River in the heart of Ottawa city. Power long has been developed at these falls. Redirecting of the area immediately around them is involved in the National Capital Plan which has been developed for Ottawa. This power, also, would be effected in the area's redevelopment program.



Military prefab uses only aluminum

A prefabricated aluminum barracks, designed to withstand Arctic gales and cold, has been completed by Army's Engineer Research and Development Laboratories, at Fort Belvoir, Virginia. It was developed under contract with the Chrysler Corp.

Aluminum beams and stressed skin aluminum panels are used in the structure. That now undergoing test is 48 ft long, 20 ft wide and 8 ft high. The length is variable in 8-ft increments. Side, floor and roof panels have a honeycomb core, faced on both sides with aluminum alloy. Heating and sanitation facilities are included.

Panels are held together with a simple, wedge-type pin. U-channel aluminum floor beams support the walls, to which, in turn, roof beams are attached. Components are restricted to about 100 lb in weight. The simple design allows prompt erection even by relatively untrained troops. Part sizes are such that they can be handled with mittens.

N. J. court ok's plan of sewerage authority

A New Jersey court has ruled legal the use of a specially constituted local authority and the sale of revenue bonds to construct sewerage works. Its ruling may open the way for similar activity elsewhere in the state. Some projects had been awaiting this decision.

Specifically, Superior Court Judge R. J. Smalley ruled constitutional an act under which the Ewing-Lawrence Sewerage Authority planned to issue about $4,000,000 worth of revenue bonds for sewerage works in two townships near Trenton. (ENR July 13, p 24). As a result, the authority planned to go ahead with the security sale.

Two citizens of one of the townships obtained a preliminary injunction against the $4,200,000 authority program. They represented citizens of a district which was connected with the Trenton sewerage system, and contended that the authority's proposal would impose an improper tax upon them. Judge Smalley asserted that the act gives the authority no power to tax residents, but ruled that no taxes would be imposed. He contended that, although attorney for the plaintiffs made several strong arguments, still the menace to public health as a result of stream pollution from improper sewerage was not one to be disregarded.

Although both sides earlier had promised to appeal an adverse decision, attorney for the plaintiffs indicated that an appeal is unlikely. The N. J. Supreme Court would hear it.

(A similar case concerning the validity of special authorities and the power to issue revenue bonds is pending in Indiana's Supreme Court. ENR July 20, p 27.)

New York City gets plan for mass bomb shelters

New York City has a plan for protecting some of its residents against bombing—atomic or otherwise. Financing of the $450 million proposal—which would protect large groups of suburban commuters and provide vast automobile parking space as well—is something else again, but city officials federal help would be needed.

The plan came to Mayor O'Dwyer from the City Planning Commission. It assumes that at least half the city's residents would have to remain in the city whatever befell. "It is generally conceded," the report went on, "that the only way in which reasonable security can be afforded against the effects of mass bombing is in the provision of shelters for all affected."

The report proposes shelters in Manhattan below 59th street, in the vicinity of 125th and 181st streets; in the Bronx-Fordham Road and 149th street; Brooklyn downtown and near the civic center, Bush Terminal, Flatbush Ave. near Church street, Kings Highway, Pitkin Ave., Brownsville and the navy yard district; Queens-Flushing, Jamaica and Astoria.

Shelters should be designed, the report said, so as to furnish all or most of parking space required in the most congested areas. They can be built in park and playground areas. The recommendation was for reinforced concrete structures with ramps between floors and adequate roof slabs.

CONSTRUCTION BUSINESS

Materials supply checkup

Materials shortages are widespread and will undoubtedly continue until the record volume of construction awarded in July is under control. Spot checks show how conditions vary by areas:

• **Florida**—Critical shortages of cement in Florida are delaying, but not stopping work. No contracts have been cancelled and bids are being taken as advertised so far. But engineers are in some doubt about the future.

Annoying delays on work are due to cement mills running 2 to 3 weeks behind schedule on contracts calling for definite time deliveries. A large bridge job in Jacksonville and a paper mill at Palatka are unable to pour concrete more than 2 or 3 days a week.

No cement is available in any retail yard and no promises on deliveries. British and Belgian producers are taking orders for early deliveries at $81 per bbl, but require 20% cash advance and price is quoted f.o.b. shipside their mills.

One contractor says the situation is the worst in his 27 years of contracting. However, the concensus is that it will level off, possibly with rationing or by holding up all future contracts except absolutely necessary federal jobs and large essential private projects. No state highway contracts have been cancelled or postponed and enough cement appears to be available for projects under contract and planned for the next three months, unless conditions change.

• **Louisiana**—Mild shortages of cement, with deliveries delayed by only a few days, are due to transportation bottlenecks and not to a real shortage such as the one in Florida. The Virginia shortage, too, is a transport problem. "Too many contractors wanting too much cement delivered at the same time."

• **Upstate New York**—The cement shortage has eased in Buffalo and Albany with struck mills back in operation and cement moving again.

• **Rhode Island**—Lumber, hardware, lime, cement, are reported short.

• **Delaware**—Gypsum lath, bathtubs, household fuel oil tanks are most critical, western lumber has been scarce all year.

Increase in forward buying is depleting electrical equipment stocks faster than they can be replenished and prices are up 10%. Lumber dealers are having stock depletion difficulties, too.

• **San Francisco**—Nails, steel products, cement are tight, also plasterboard (orders not being taken). Lumber stocks now adequate but price rising. Shortage may develop if Pacific defense exports continue to rise.

Some Seattle wages hold with cost of living index

Since the cost-of-living index has not moved the two points necessary to change wages, building trades at Seattle, Wash., will not receive a wage increase next year, under a master agreement between unions and employer groups. An escalator clause based on changes in the index governs the hourly wage scales of workers coming under the agreement.

E. B. Hickok, manager of the Seattle Construction Council, announced the decision after a meeting of a joint employer-union conference board. The U. S. Department of Labor index for March 15, 1949, to March 15, 1950, was used to determine wages in 1951.

The agreement is not as inclusive as it once was, however. Bricklayers withdrew last year, reaching a pact with another employer group that agreed to pay the $3 the bricklayers demanded. Some bricklayers now are reported to be getting $3.25 to $3.50 an hour.

The electrical workers withdrew recently to receive a wage increase from $2.395 to $2.50 an hour.

Plasterers have remained within the agreement but, by common understanding, get $3 an hour rather than the stipulated scale of $2.495.

Industrial building runs ahead of 1949 contracts

Industrial building has confounded the experts this year by running 25 percent ahead of last year. Through July, 1,522 contracts have been reported to ENGINEERING NEWS-RECORD, totalling $687 million against $551 million a year ago.

Examination of this building at its source shows the process industries in the lead for volume with $165.5 million, a rise of 50%. Public utilities are second in volume with $165.4 million but this is a 38% decline from last year.

The accompanying table shows the score at the close of July.

Industry	Proj	1950 7 months $ Volume	% chg from '49
Railroad	23	$9,670,000	+ 88
Auto Service	160	27,385,000	+ 52
Public utilities	79	165,375,000	+ 38
Process industries	243	165,517,000	+ 50
Food industries	269	66,190,000	+ 22
Metal Ref & Roll	22	70,459,000	+ 205
Automobile	11	34,270,000	+ 193
Aircraft	3	2,572,000	+1069
Foundries	9	14,614,000	+4355
Mach & mach parts	177	89,385,000	+ 53
Radio	5	892,000	+ 6
Textiles, no plastics	54	6,352,000	+ 22
Wood industries	27	6,759,000	+ 102
General	435	78,603,000	+ 18
Refrig & cold stor	5	705,000	+ 63
	1,522	$686,978,000	+ 25

Proposed construction backlog tops $49 billion

Proposed construction on record with the CONSTRUCTION DAILY totals $49.4 billion at the end of July. This compares to $47.3 billion last year.

During the 7 months of 1950 to date $5.2 billion has come out of the backlog as projects advanced to contract status. In this period new proposed work totalling $5.3 billion has poured into it, to replace the projects moving out and to increase the total backlog by $2.1 billion.

The present backlog includes:

	Billions
Waterworks and sewerage	$ 3.5
Highways and bridges	6.0
Earthwork, irrigation drainage	7.5
Public and private unclassified	9.6
Industrial	4.7
Commercial buildings	6.7
Public buildings	11.5

In these areas:

	Billions
New England	$ 2.4
Middle Atlantic	12.3
Southern	5.5
Middle West	8.0
West of Mississippi	12.8
Far West	8.4
United States	49.4

Cost of living rises 1.9%

The consumers price index for mid-June is up 1.9% since March, 1950, 0.9% since May. The big increase reported by the Bureau of Labor Statistics is in food, up 4.4% since March, 2.1% since May.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 86, went to press.)

Apartment—Claremont Construction Co., Philadelphia, Pa., was awarded contract for apartment building at 15th St. and S. Rittenhouse Square by the Rittenhouse Claridge Co., Philadelphia. Estimated cost is $10,000,000. Samuel I. Oshiver, J. Raymond Knopf and J. Ethan Fieldstein are architects.

Power Project—Aluminum Co. of Canada, Arvida, Que., plans hydroelectric development of 400,000 horsepower on Peribonka River for estimated $30,000,000.

Terminal—Port of Boston Authority, South Boston, Mass., plans to reconstruct terminal in East Boston for estimated $7,500,000. Fay Spofford & Thorndike are consulting engineers.

Automotive Plant—Chrysler Corp., Detroit, plans to construct 1-story, 650,000 sq. ft., brick, structural steel automobile transmission system manufacturing plant on 150-acre site in Indianapolis, Ind. Estimated cost is $7,000,000. Albert Kahn Associates, Detroit, is architect.

Refinery—Trinidad Leaseholds Ltd., Port of Spain, Trinidad, awarded contract for modernization of refinery in Pointe-a-Pierre to Foster Wheeler Corp.; Port of Spain, for $7,500,000.

Shopping Center—Lake Forest Development Corp., St. Louis, Mo., plans to construct $7,500,000 shopping center in 7000 block, Clayton Rd., Richmond Heights, including 5-story tower for department store; 2-story buildings for apparel shops, restaurants, food mart, automobile agency, supermarket, medical building, chain stores; underground parking space for 2,000 automobiles and surface parking for 1,000 cars, on 23-acre tract. Harris & Brown, New York, N. Y., are architects.

Grade Separation—New York State Department of Public Works will construct two 2-span bridges to carry Main St. and Kensington Ave. over reconstructed section of Humboldt Parkway in Buffalo for about $2,209,000.

Apartment—Warner and Kinter, Birmingham, Ala., awarded contract for 14-story, 300-unit Essex House apartment at northeast corner Pennsylvania and Vermont Sts., Indianapolis, Ind., to J. L. Simmons Co. of Chicago at $4,000,000. Merritt Harrison, Indianapolis, is architect.

Sewers—Philadelphia, Pa., Department of Public Works received low bids on main gravity intercepting sewers from Peter Kiewit & Sons Co., Chicago, at $5,432,814 for contracts A, B & C; from Square Construction Co., Baltimore, Md., at $2,629,205 for contract A, $3,152,913 for contract B, $745,995 for contract C; and for sewers Schedule B-1 from Robert Lombardi, Philadelphia, at $194,150. A. Zane Hoffman is chief engineer for owners.

Generating Plant—Gulf Power Co., Pensacola, Fla., will build 50,000 horsepower steam-electric generating plant in River Junction, Fla., for $4,000,000.

Shopping Center—National Suburban Centers, Inc., Boston, Mass., awarded contract for regional shopping center, Worcester Turnpike, Route 9, Framingham, to George B. H. Macomber Co., Boston, at $5,145,000. Ketcham Gina Sharp, New York, N. Y., is architect; Kenneth C. Welch, Frederick Adams, and Sidney Shurcliff, Boston, are consultants.

Hospital—N. E. Deaconess Hospital, Boston, Mass., asks bids August 22 for 10-story, 1,000,000-cu ft, brick and steel building. Coolidge Shepley is architect; Bulfinch, Abbott, Gilbert Small & Co., Inc., engineers.

Stores—Jos. Skilken & Co., Columbus, Ohio, was awarded contract by Morehouse Martens Co. and The Fashion to remodel two store buildings separated by alley with connecting bridge into single building, new front, etc. for $3,000,000, in Columbus. Mark Frankhopf is architect.

Cement Mill—Mag Ltd., Germany and St. John's, Newfoundland, will construct $3,000,000 cement mill on islands west coast near Corner Brook, N. F.

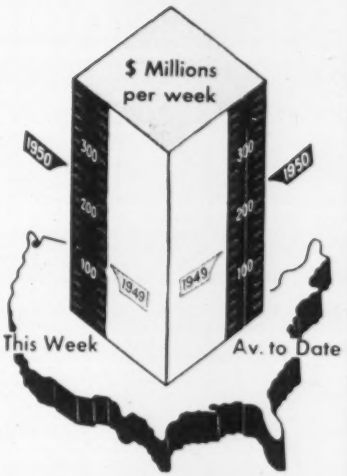
Utilities—Morrison-Knudsen Co. and Peter Kiewit Sons Co., Seattle, were low bidders jointly for construction of outside utilities in east expansion area, Fort Richardson, Alaska, including grading, storm and sanitary sewers, steam distribution and electrical distribution facilities, for $2,392,000. Col. L. E. Seeman is district engineer for the U. S. Corps of Engineers.

Blast Furnace—Dominion Foundries & Steel Ltd., Hamilton, Ont., awarded contract for blast furnace at plant to John Mohr & Sons, Chicago, at $4,500,000 and for erection of battery of coke ovens to Koppers Co., Pittsburgh, Pa., at $4,500,000.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	100	1913	1926	1949
Construction Cost	Aug '50	520.60	250.25	109.14
Building Cost	Aug '50	382.36	206.69	118.63
Volume	July '50	495	217	175



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	Week of Aug. 17 1950	Cumulative 1950 wks.)	Cumulative 1949 wks.)	% chge
Federal	$2.8	$86.2	$215.2	+21
State & Mun.	77.6	2,292.4	2,072.3	+11
Total Public	$80.4	$2,156.7	$2,287.5	+13
Total Private	169.7	4,306.9	2,105.6	+79
U. S. Total	$250.1	$7,163.6	$5,193.1	+11

Contracts by type of work

	This Week	Cumulative 1950 wks.)	Cumulative 1949 wks.)	% chge
Waterworks	$4.1	$141.7	$149.9	−5
Sewerage	2.0	158.9	168.2	−6
Bridges	6.0	241.2	207.8	+16
Highways	28.8	586.3	607.5	−3
Earthwork				
Waterways	2.2	302.4	329.5	−8
Buildings				
Public	20.1	1,046.1	788.3	+33
Heavy, pub.	9.3	384.3	384.1	+0
Heavy, priv.	58.8	2,104.8	1,654.1	+13
Commercial	26.4	621.6	372.7	+66
Industrial	50.2	798.2	681.8	+17
Unclassified	18.6	862.1	781.3	+67

NOTE: Minimum size projects included are: Waterworks and waterway projects, $25,000; other public works, $50,000; industrial buildings, $50,000; other buildings, $250,000.

New capital for construction

	Cumulative 1950 wks.)	Cumulative 1949 wks.)	% chge
Corporate Securities	$1,312.7	$1,620.3	−17
State and Municipal:			
Excl. housing	1,367.2	1,225.9	+12
Housing	183.3	218.0	−7
Total Capital	$3,192.2	$3,193.3	−8

EVERYBODY'S INTERESTED

Philadelphia has asked the U. S. Conference of Mayors to ascertain whether there's to be any sudden freezing of building materials. It must decide soon whether to include a $12,000,000 bond issue on the ballot for the November general election, and it doesn't want to raise the money if it won't be able to spend it on the vast program which has been drawn up.

California 'quakes hit Imperial Valley works

Twelve shocks during week damage irrigation projects, buildings, bridges and other structures

Earthquakes starting July 27 in California's Imperial Valley and continuing until the 12th quake was recorded Aug. 2 have caused subsidence of canal banks, disrupted irrigation flow on some farms, and damaged buildings, bridges and other structures. An unofficial estimate of the total damage to structures was $300,000. Loss to farmers probably equals that amount.

The quake had a maximum intensity of 7 on the modified Mercali scale.

Severity of the quakes was localized in an area about 6 mi square, including the towns of Calipatria and Westmoreland. Epicenter of the temblors was placed in the vicinity of the Imperial Irrigation District's Northend dam across the Alamo River, southwest of Calipatria. The dam was cracked and there were a few subsidences from continued movement of the underfill.

• **Old fault, new quake**—The center of the quake appears to be about 20 mi from the famous San Andreas fault in a "dead" fault zone which seems to have become reactivated.

Within the affected area a section of about 2 sq mi experienced what some observers described as steam geysers. B. A. Wyse, executive engineer for the Imperial Irrigation District, explained that what actually happened was that local ground water was squeezed out at high pressure, shooting up water and sand from 2 to 4 ft. In some instances these spouts were as close as 50 ft apart. The duration varied from 2 hours to all day, the pressures at the start being considerable.

The irrigation district damage will amount to around $15,000, according to Wyse. Cleaning canals, unplugging drains and culverts under roads and like work will be the major task. Wyse commented that this was a burdensome, but not serious.

The principal damage was done during a July 29 quake. All of the 15 buildings on Calipatria's Main Street were cracked and plate glass fronts smashed. Frame and stucco sidewalk canopies were cracked and in several instances toppled. A Southern Pacific Railroad trestle 2 mi west of the town was raised 1 ft above the roadbed and may have to be replaced. The 125-ft steel trestle crosses a dry gulley. The same railroad had a 47-car freight derailed Aug. 2 in Baja California, at about 40 mi east of Mexicali, due to a canal break flooding the tracks.

The main highway of the region was out of the seven-quake area, but an older road connecting the quake towns of Calipatria and Westmoreland was damaged by several longitudinal cracks because of subsidence of fill.

Damage was slight in the other Valley towns of El Centro, Brawley, Imperial and Mexicali.

No estimates have been made, but the greatest damage may prove to have been to crops in the lush valley region. This would come from irrigation water being delayed for a time such as 24 hr before ready of the blocking of flow in other cases. Farmers in the area have the problem of correcting the level of their fields where there has been disruption.

AEC figures plant construction costs for atomic age: Finds real inflation

If and when American industry begins to use radioactive materials at all widely in its conventional processing plants, the construction industry can expect a business volume startlingly above today's boom level.

There isn't very much firm data available and the day when such processes will be in use is still a little remote. But the latest report of the Atomic Energy Commission gives some idea of what could be expected.

• **Multiply by 12**—AEC figured comparative costs of a hypothetical food canning operation. One set of costs assumes a conventional operation in which no radioactive process is used. The other was for the identical operation with the use of radioactive materials. Capital investment alone would be 1,100% greater for the radioactive process than would be required for the conventional one.

That isn't all. Process equipment and installation would be vastly greater for the radioactive operation, along with operating expenses and depreciation charges.

AEC's study assumed that a given operation could be performed conventionally in a plant whose total capital investment would be $1,000,000. Then it calculated costs for the same operation, with comparable facilities, using a radioactive process. The comparison is shown in the accompanying table.

• **Multiply by 51**—The radioactive process would require a massive concrete building, with walls many feet thick and heavy interior enclosures for equipment. The conventional process would be performed largely in the open, with only a small inexpensive building.

In the radioactive process, much equipment would have to be controlled remotely and repaired and maintained the same way. Multiple sets of some facilities would be required because some repairs could not be made without dismantling the whole operation.

• **Multiply by 88**—The radioactive plant would require a tremendous added investment for artificial ventilation so that radioactive dusts and vapors could be handled safely. There'd be required a large inflow of fresh air, as well as a thorough filtering of exhaust air.

In storing process materials and handling wastes the radioactive plant's costs again would carry a heavy increment. Large amounts of materials are required to render radioactive wastes harmless, and they too would have to be stored and handled.

AEC figures it would be 177% more costly to perform certain routine processing operations with radioactive material than otherwise—$2,067,000 per year as against $747,000 for the conventional process.

In studying depreciation, AEC assumed a composite rate of 10% per year. It concedes that's probably high for the conventional plant and admits that there's no real standard on which to base a more precise estimate of the rate that properly might be applied to a radioactive process plant. But assuming 10% per year and applying it to the investment required for each process, the disparity in requirements is tremendous.

Comparative Construction Costs

	Conventional	Radioactive
Process equipment	$ 827,000	$1,583,000
Structures	173,000	4,335,000
Utilities	100,000	412,000
Yard work	50,000	204,000
Process piping, design	20,000	345,000
Waste disposal	40,000	745,000
Miscellaneous & contingencies	50,000	983,000
Site preparation	50,000	350,000
Total	$1,310,000	$9,007,000

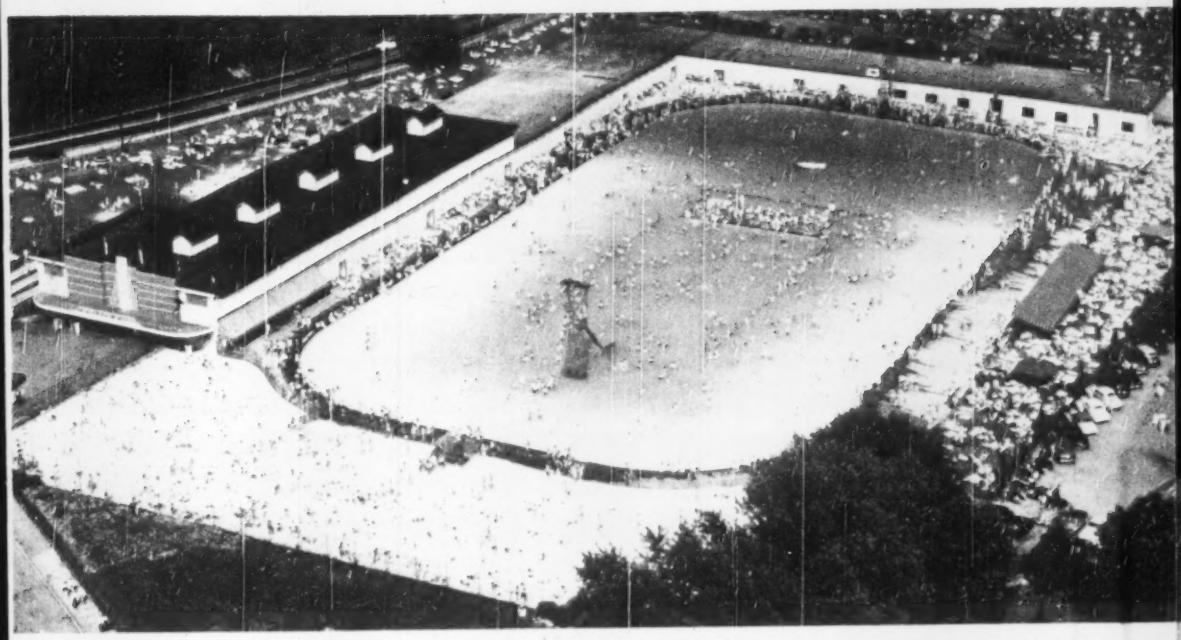


FIG. 1. BEHIND THE GOOD FUN that a swimming pool affords must be careful planning, a large investment and good management (Coney Island Park, Cincinnati, Ohio—Mayfield Photos, Inc.)

Design and Operation of

Outdoor Swimming Pools

A guide to good practice

John C. Bumstead, Associate Editor

TO AMERICA'S PENCHANT—and opportunity—for recreation can be attributed many a new field of activity for engineers and public officials.

Recreation sparks design and construction of parkways, of stadiums, of beach and mountain parks, of drive-in theaters and golf courses. It has spawned the great demand for swimming pools so apparent at the present time. Enough pools have already been built to warrant the prophecy that another decade will see at least one large pool in every city in the land over 10,000 population.

Most of these pools will be publicly owned, but many will be promoted and run privately. And to these large pools will be added countless others of family or neighborhood size, individually owned. So far, only the rich think of swimming pools as a home accessory, but that situation is sure to change. The American public is not one to postpone for long making necessities out of erstwhile luxuries.

As an dynamic and growing field, that of swimming-pool design and operation is never static. There are new practices, and there are new people coming into the field. They may be designers, builders, operators, supervisors or manufacturers of equipment. All of them would benefit from a guide to good practice. To that end, this report—which briefs out basic design principles and approved operation techniques—is presented. It is based on an extensive survey by ENGINEERING NEWS-RECORD of new pools; an analysis of state health department regulations, and consultations with designing engineers and pool operators. While a guide to good practice will not guarantee good swimming pools, it should encourage better designed pools, protective sanitation, satisfied patrons and financial success for the operator—be it a municipality or a private investor.

Basic Design Considerations:

Design of a pool is in four phases: (1) Need, site, size and shape; (2) structure; (3) water treatment; and (4) bathhouse and managerial facilities. Taking the points in order:

• **Need**—Does a real need for a new pool exist? If so, where should it be located to draw the greatest number of patrons? Is an acceptable site available in this vicinity? Can the pool be built in connection with a school, park or playground? Will swimming and diving contests be held?

Before a project is undertaken, a swimming "market" must be assured either to guarantee financial success or justify large investment required. Factors are: Density and economic status of population to be served; customs and local habits; average age and sex of patrons; location of other pools.

A rough measure of need for a pool may be obtained by checking potential patrons through schools and clubs, and spotting other pools on a city map. It has been suggested that a postcard survey might gage swimmer interest. Another factor is water contamination at any natural bathing beaches. Existence of health hazards is good reason for new pools.

Climate also affects design. Other questions: Is the pool to be used only during after-school hours? Will the pool be part of a recreation center and provide mass swimming only during the summer?

Maximum daily attendance will range from 5-10% of the population for cities up to 50,000, according to an Iowa State College study. Average daily attendance, by another rule, will be 2-3% of the population, and maximum patronage at any one time will probably be about one-third of total daily load. These methods, it should be noted, yield only rough estimates.

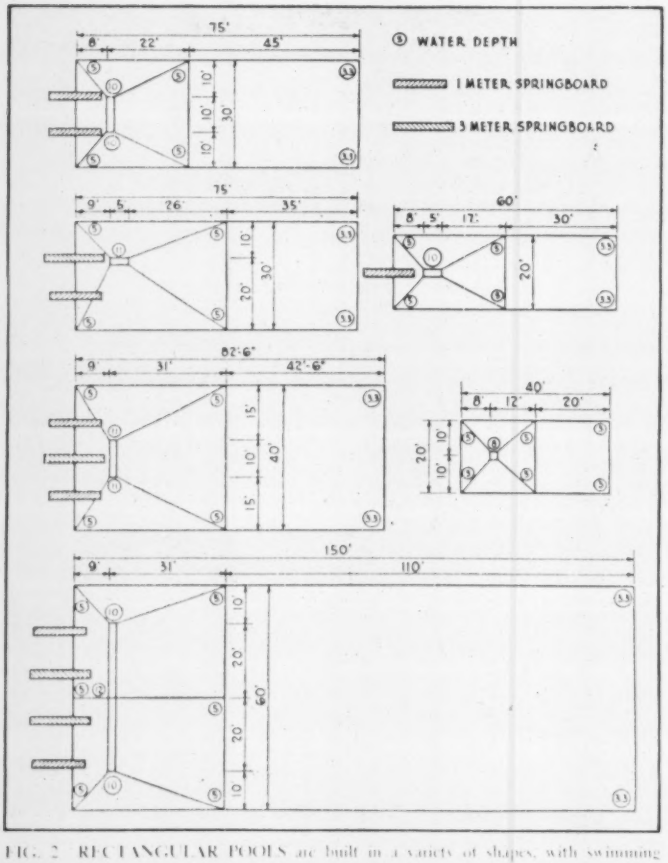


FIG. 2. RECTANGULAR POOLS are built in a variety of shapes, with swimming and diving areas at opposite ends. (Portland Cement Assn.)

• **Site**—Pool location is controlled by: Availability of public transportation; parking space; water supply and sewers; topography; shape and extent of site; relation to parks and playgrounds; freedom from atmospheric pollution.

Sufficient water must be available under normal pressure to operate the pool effectively. Nearby sewers should have capacity to handle drainage without flooding adjacent cellars.

The pool should be set high enough to utilize gravity flow for surface, subsurface and tank drainage; pumping adds to first and operating costs, and is a risk in case of pump failure.

The pool's long dimension should be on a north-south axis, to put spectators on the west side where the sun will be behind them in the afternoon.

If the pool can be built in a park or playground, land costs may be negligible, and coordination with recreational activities is facilitated.

New pools should not be located near factories, incinerators, railroads, or certain "dirty" trees, such as the cottonwood. Soot, dust and smoke make water treatment more difficult and expensive.

Natural shields can be utilized against prevailing winds, but should not cut off sunshine.

• **Size**—Controlling factors are sufficient area to handle largest average crowd; available building site; and funds available. A caution: Pools are not designed for maximum load anticipated only a few times a year! They should be large enough to serve an average peak demand in July, but small enough to operate economically at the beginning and end of the season.

Recent practice indicates a trend to smaller pools. Strategically spotted in a community, several moderate-size pools usually give better service than one large pool. Oversize projects incur extra water-treatment and maintenance costs.

Basic to capacity determination, pools are classified as to activities provided: Mass recreation, social swimming and diving; and competitive swimming and diving plus instruction. Community pools (usually outdoor) are generally dual-purpose, embracing all features for both types of activities.

• **Determining load**—A method for proportioning pool area to expected load is recommended by a joint committee representing the American Public Health Association and the Conference of State Sanitary Engineers.

By this method, pool capacity is calculated from surface area and water volume and treatment. Here's how:

Divide the pool into three zones—recreation, swimming and diving—compute loads separately, and combine loads to get total surface needed for the pool.

1. Recreation area—A wader (nonswimmer) occupies about 10 sq ft (about half that of a swimmer) of shallow water less than 5 ft deep.

2. Swimming space—A swimmer requires about 36 sq ft of water more than five feet deep. Since all swimmers will not be in the water at the same time, this figure can be sliced to 27 sq ft for calculating the area needed.

3. Diving section—An area approximating a 10-ft radius circle centered on the extremity of the springboard should be reserved for divers. Only three divers are permitted under a board at one time, but three times this number will be waiting behind it for their turn. Maximum allowed per diving board is 12 divers.

4. Pool capacity is limited not only by area needs, but by water content and amount of clean water added. The Joint Committee recommends that "the total number of bathers in a pool in any period shall not exceed 20 persons for each 1,000 gal of clean water added during the period."

This allowable pool load generally will be determined by surface area instead of water supply. This applies to pools with ordinary dimensions and complete water turnover in 8-12 hr.

Closely allied with pool capacity are walk and play areas. If there is ample space for sun-bathing, patrons in the water will be greatly reduced, cutting down pool area required per bather. A minimum of 10 sq ft of walk and deck area is needed for each patron.

• **Shape**—Pools are built in a variety of shapes: Rectangular, "L", "T", oval, trapezoidal and circular.

Rectangular pools, with deep and shallow water at opposite ends, are the most practical and efficient (Fig. 2). Their advantages include: straight, uniform lanes and flat walls for racing, better lifeguard vision, a well defined area for instruction.

Swimming, recreation and diving can be separated in "L" or "T" pools—top of the "T" and a leg of the "L" are assigned to diving.

Oval, trapezoidal and circular pools can be adapted to irregular terrain. They also result from preferences of clubs or individuals. Lately also, there seems to be a trend toward trapezoidal and "fan-shaped" pools for communities because of increased ratio of wadable water to total pool volume.

• **Lengths, widths and depths**—Various lengths and widths are combined for rectangular pools. Recommended are: 60X20 ft; 60X25 ft; 25 meters (82.5 ft long) x 40 ft; 110x45 ft; 150x60 ft; and 50X20 meters (Olympic). Some rate the fourth and fifth combinations as best for allround purposes.

Minimum length is generally 60 ft, but private pools may, of course, be shorter. Intercollegiate and interscholastic events require 75 ft. This dimension is made about one inch longer to insure recognition of records.

Pool widths are laid out in multiples of 6 or 7 ft lanes. U. S. as well as international competitive standards require at least five lanes, each 7 ft wide.

Dimensions of irregular shaped pools are worked out on the basis of specific site and use conditions.

Depth of water for swimming and recreation sections ranges from a minimum of 3.25 ft at the shallow end to not more than 6 ft at the edge of the diving area (Fig. 3). Slope of bottom should not exceed 1:15 ft. No sudden changes are permitted where depth is less than 5.5 ft. Flat spots on bottom collect sediment.

From the deep end of the swimming section, the bottom should drop toward the diving section to a 10-ft minimum depth in the next 10 ft (slopes vary widely). Then slope up at 1:4 to the end of the pool under the springboard.

Checks on both sides and at both ends are at least 10-to-20 ft wide.

Spoon-shaped bottoms—a sloping plane under swimming area plus a hopper with deepest portion under boards—meet diving requirements as well as bring about reduced excavation, concrete costs and water volume (Fig. 5). Minimum depth along pool walls varies from 4.5 to 6 ft.

Safety ledges may be built on vertical walls around the deep portion. These are 4-6 in. wide, slope 0.5 in. toward the pool and are located 4.5 ft below the water surface.

For small pools—75x30—with a high and low board side-by-side, off-center hoppers are suitable.

• **Overflow trough**—Three types of overflow troughs are normally used. Semi-recessed; open recessed; open and roll-over (Fig. 4, a, b and c). Roll-over trough is favored.

The edge of the trough will be used by swimmers as a handhold. It should extend completely around the pool, be easy to clean, drain quickly and be absolutely level.

While overflow troughs are built with a variety of shapes and dimensions, depths and widths are not less than 4 and 2.5 in.

Ample drainage should be provided. Pitch of trough bottom is not less than 3 in. per 10 ft. Drainage outlets are located at 10- and 15-ft centers for 2- and 2.5-in. pipe, respectively. APHA recommends not less than 2.5-in. outlets with connections to larger drains.

Drainage from troughs is discharged

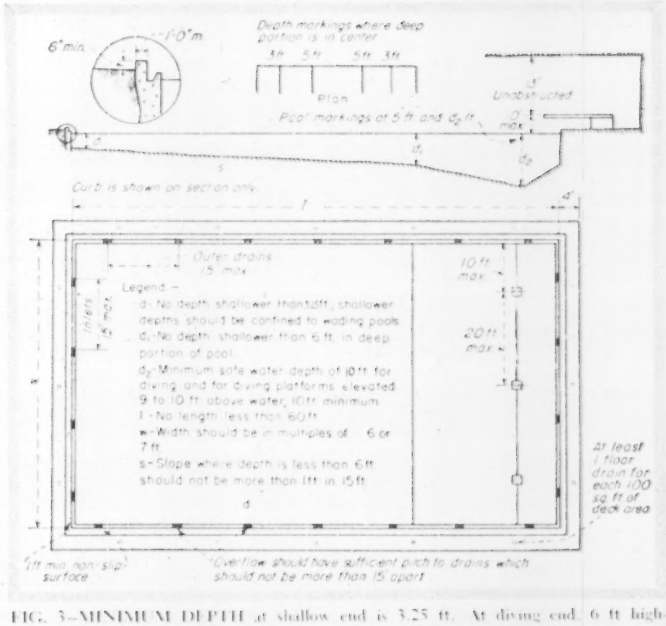

6" min.
1'0" m
Depth markings where deep portion is in center
5 ft
5 ft
5 ft
3 ft
Plan
Pool markings at 5 ft and d_2 ft
Curb is shown on section only
Outer drains 15' max.
10 ft max.
20 ft max.
Legend:—
d = No depth shallower than 3ft; shallower depths should be confined to wading pools
d_1 = No depth shallower than 6 ft. in deep portion of pool
d_2 = Minimum safe water depth of 10 ft for diving and for diving platforms elevated 9 to 10 ft. above water, 10 ft. minimum
l = No length less than 60 ft.
w = Width should be in multiples of 6 or 7 ft
s = Slope where depth is less than 6 ft should not be more than 1 ft in 15 ft
At least 1 floor drain for each 100 sq ft of deck area
"Overflow should have sufficient pitch to drains which should not be more than 15 apart"

FIG. 3—MINIMUM DEPTH at shallow end is 3.25 ft. At diving end, 6 ft high-board diving depth should be no less than 10 ft. (Architectural Record).

directly to waste or to a pump-suction well or balancing tank. It is desirable to arrange piping so that surface water may be either wasted or repurified.

A number of pools include a coping entirely around the pool, just above the overflow trough. If used, coping should be 18 in. above water line and 24 in. wide at the ends. Along the sides, it should be 12 in. above water level and 12 in. wide. Rounded corners and non-slip finish must be used. The trend, however, is away from copings because of tripping hazard.

• **Lining**—Bottom and sides of pools are either white or a light color. Light blue enhances attractiveness of a well-treated water. Lining is smooth and free from cracks and joints; all corners are rounded.

Tile or glazed-brick linings are recommended for small outdoor pools. While white cement finish is used for large outdoor installations, rubber-base paints appear to be preferable. Plastic coatings may prove to be advantageous in the future. Dark finishes, such as asphalt paints, do not show dirt and are not suitable. Aluminum paint is also too dark under water. Sand or earth bottoms that cannot be kept clean are undesirable.

• **Marking**—Colors of markings should contrast strongly with the finish. Depth markings are set at top of copings over 5, 5 and 10-ft depths on both sides of the pool, but indications at one-foot increments are desirable. Letters should be 4 to 6-in. high, made of one-inch strips. "Shallow" and "Deep" are set into the finish at respective ends.

Lane markings on the bottom also contrast with lining. It should be noted that competitors swim directly over lane lines and not between them. Lane lines, 10 in. wide, start 4 ft from each end of the pool with one-foot cross marks, 7 ft from each end.

Anchors for lane or area-separation buoys are always recessed in walls. Non-corrosive anchors providing ready attachment of lines and a minimum of hazards should be flush with the lining. A threaded-insert type of anchor is preferable.

• **Access facilities**—Recessed ladders, step holes or stairs for entering and leaving pools should be designed with non-slip treads and be located at both sides of the deep section. If wall height is more than 2 ft, ladders or steps are required at the shallow end. Minimum for small pools is four; large pools require more. Steps are 3 in. deep and 15 in. wide. Stairs should not project into the pool but be recessed into the wall (Fig. 5). Step holes in the wall must be readily cleaned and drained.

Non-corrosive handrails on both sides of exit facilities lead out over the walkway. A single vertical pipe—set in the deck in front of the ladder—is a good handhold.

• **Decks and walkways**—A deck not less than 8-10 ft wide should extend around three sides of the pool. Adjacent to the diving section, it is at least 20 ft wide. Deck area is generally equal to that of pool surface, based on the assumption that 50% of patrons are swimming and 50% are sun-bathing on the deck.

Walkways around pools should have a pleasing light color, be easily cleaned and non-slip.

Recommended slope of walkways is about 3 in. per 10 ft away from outdoor pools to floor drains. One drain for each 100 sq ft is required.

Approaches to pools should be ramped—slippery stairs and steps are responsible for 50% of accidents.

As a general rule, outdoor-pool decks are spacious to permit sunbathing. They should include wooden benches about 7 ft long with a 6-in. slope to chair height at the pool side. They may be made of 1x4-in. dressed boards with a 45 deg bevel along each top edge, set ¾ or ½ in. apart. They should not face directly into the sun.

• **Towers, springboards and floats**—Diving boards are spaced 15 ft apart and at least 12 ft from each side of the pool. Top edge of the low board is one meter above water level. The board slopes about 2 or 2.5 deg upward to the end, is at least 14 ft long (16 ft is better) and projects one meter (3.28 ft) or more beyond the pool edge. The board is rigidly fixed to the rear of the tower and supported over a fulcrum adjustable for height at the front edge. At least 13 ft of unobstructed space is needed above the board. Considerably more headroom should be provided at competitive pools. Diving boards are supported on towers, rigidly constructed, properly and thoroughly anchored below the pool deck.

For swimming competitions, an arrangement to permit rotation of boards away from the pool is desirable. Competitive rules require 18-in. removable, wood diving boards with cocoa matting or non-slip material.

Hollow, aluminum, laminated div-

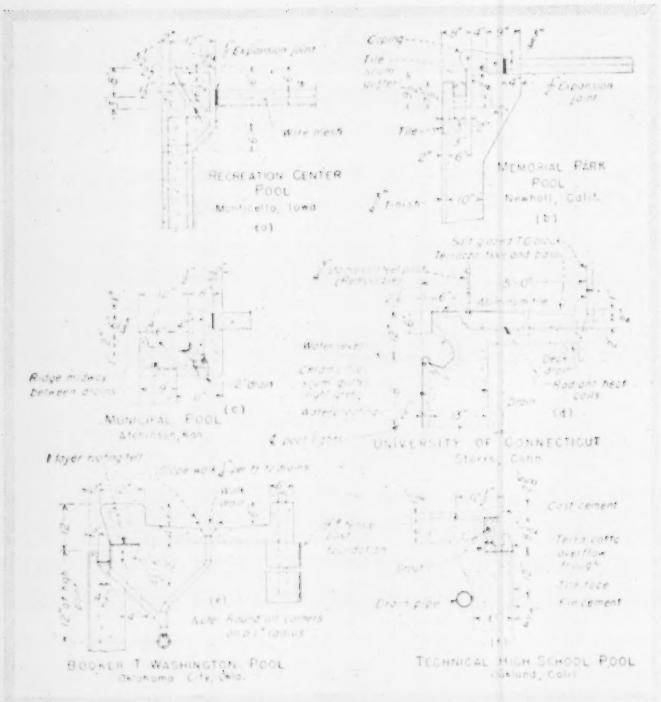


FIG. 4—OVERFLOW TROUGHS are formed in concrete or made with precast sections. To insure uniform overflow, lip must be exactly level. Although curbs above troughs are sometimes used, some experts consider them cause of slipping accidents.

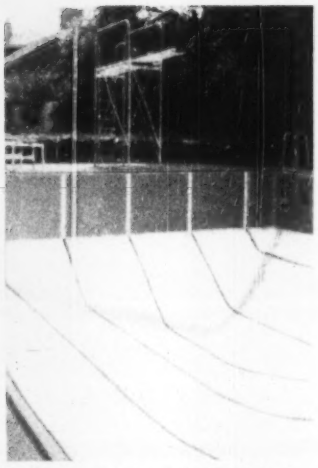


FIG. 5 SPOON SHAPED bottoms make for lower costs. (Oak Park Country Club, Ill., Mayo & Mayo, Architects.)

ing boards are available? They are more expensive, but are claimed to outlast several wooden boards. Minimum boards will probably be approved for competition.

Minimum water depths under boards one and two meters above water level are 10 and 12 ft.

When fixed platforms or floats are provided in pools, they should have at least 1 ft of air space underneath. A minimum of underwater columns and bracing will reduce possibility of swimmer entanglement.

• **Lighting**—Complete artificial lighting systems—overhead and underwater—are necessary for pools operated at night. Design considerations are: Uniform illumination of approaches, deck, pool surface and water; proper vision for life guards; elimination of glare; and spotlighting of diving boards for safety.

For overhead illumination, indirect as well as semi-direct lights are desirable. For controlled use (shallow and deep ends), these lights should be on banks controlled from the director's office and set back from the pool to keep insects away. Vapor-proof, accessible, serviceable and recessed equipment is always specified.

Underwater lighting not only adds a decorative effect but increases swimmer safety (Fig. 6). Set behind panes of glass or permanently fixed in pool walls, underwater lights can be installed to create no electrical hazard. Spacing is 1.5-3 ft below water surface and 10 ft apart. Light beams are horizontal for depths under 5 ft, but are tilted slightly downward for illuminate deepest portions. Service is best afforded from an around-pool tunnel built under the deck.

Other desirable equipment is: Special lighting arrangements for pageants, and constantly lighted warning lamp, a vapor-proof clock, and public-address system.

• **Bathhouses**—Bathhouses should contain separate dressing rooms, showers, toilets and lavatories for both sexes; a manager's office, first-aid room, check room and pool equipment storage space.

Separate entrances and exits for men and women are essential, with no connection between their quarters. Entrances and exits to and from the pool are placed at the shallow end. Line of sight into dressing rooms may be broken by partitions.

Bather travel is channeled from dressing rooms, through the toilet room and into showers, with pool entrance from showers. Dressing rooms are re-entered from the pool by a one-way turnstile.

Dressing rooms are dimensioned for actual attendance by sexes. This will be about one-third women and girls and about two-thirds men and boys, but the ratio may approach 50-50 at many public pools. From 5 to 10 sq ft should be provided per patron.

Floors in dressing, toilet and shower rooms should be smooth finish, impervious to moisture, free from cracks and open joints, non-slip insofar as possible, and pitch 3 in. in 10 ft to floor drains on 12 to 15 ft centers. Concrete is the best material for this purpose. Coved joints connect floors with walls and partitions. Wood floors or slats over concrete floors should be prohibited. Curbs around wet areas are a source of serious falling accidents; they should not be used.

Walls and partitions should also be smooth, impervious and without cracks or open joints. If wood walls are used, cracks and joints should be filled and painted with a sanitary, waterproof coating.

Dressing stalls are no longer recommended either for men or women; they complicate maintenance. If included, they should be not less than 4 in. above the floor to permit effective flushing. Minimum size: 3x4 ft.

Furniture should be simply constructed and easily washable. Lockers, if used, should be vermin-proof and properly ventilated.

One trend is construction of bathhouses without roofs (Fig. 7). Open-court design is less expensive and permits entrance of sunlight. A cantilever awning around perimeter of bathhouse provides shade as well as storm protection.

• **Showers, toilets and lavatories**—To determine number of showers, toilets and lavatories needed, the recommendation of the APHA is generally followed. This is: Showers—minimum of one per 40 bathers expected at maximum load; toilets—one per 40 women, one per 60 men (also one urinal per 60 men); and lavatories—one per each 60 patrons.

An ample supply of hot and cold water is a shower-room essential. Manually operated valves must insure a satisfactory mixture of hot and cold water without danger of scalding. Chain pulls are not recommended; foot-controlled valves are considered best. Showers should be fitted with unremovable fixed-spray heads. Gang showers for 50 and 25 men and women bathers may be desirable.

Adjacent to each shower, an ample supply of liquid or powdered soap promotes body cleansing. Soap cakes cause accidents.

In well-designed layouts, toilets are "inside dry" just off dressing room entrances or "inside wet" for patrons using showers or while wet. Both types are open front, elongated lip, siphon-jet type. Wall-hung to facilitate floor flushing, they do not have seats and are equipped with concealed, non-automatic flush valves and siphon breakers. Heights are 10 in. for children and 13 in. for adults.

Toilet stalls should be enclosed with mark-proof, non-corrosive and durable partitions without cross pieces that encourage swinging. Partitions start about 12 in. above the floor and extend up 5 or 5.5 ft. Doors with gravity hinges swing inward and remain open when not occupied.

Urinals, in general, are stall-type, with integral lip. The base is flush with the floor, pitching into the urinal. Flushing is by hand, foot or automatically.

Vitreous-china lavatories are equipped with tamper-proof, spring valve controls, hand- or foot-operated. Hot and cold water is delivered through a common faucet with the opening 1 in. above the rim. Bird bath lavatories for communal washing are practical for large pools.

Wall-recessed drinking fountains should be located around the pool as well as in dressing rooms. With adjustable, automatic pressure control and a foot-operated valve, the stream is set at an angle, the supply opening above the rim of the bowl. Bowls are cornerless with anti-splash rims. Drinking fountains drain directly to sewers; outdoor installations must be frost-proof. Indoor fountains are recessed in walls. Heights are 25, 29 and 36 in. for various age groups. Two or three steps may be required for small children (Fig. 14).

Cuspidors near drinking fountains

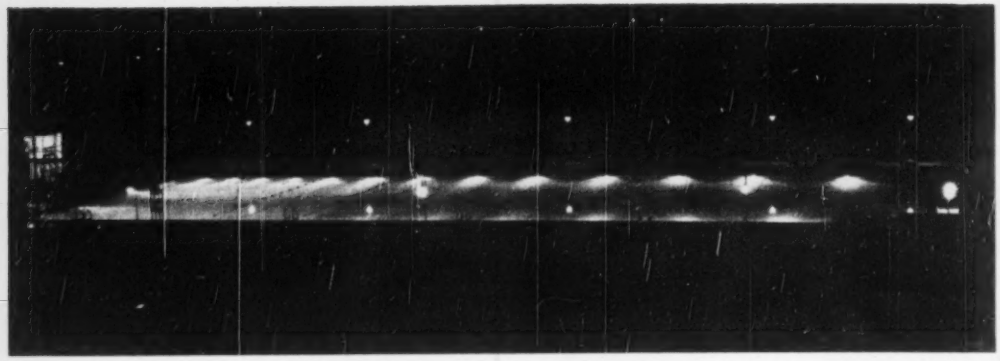


FIG. 6. UNDERWATER LIGHTING as well as overhead illumination is needed for safe, attractive night swimming (Arena Pool, Cincinnati, Ohio, W. D. Becker, designer).

(Fig. 14) should be recessed in walls.

To facilitate floor washing, at least 1-in. non-corrosive, tamperproof hose connections may be spotted in service, dressing, and toilet rooms and around the pool, placed high enough to fill buckets.

Considerable controversy exists as to value of foot baths. It is apparent, however, that the foot bath is losing favor because disinfecting solution is usually not maintained at full *strength*, and effective contact period is not possible. At least 5,000 ppm available chlorine is needed constantly for effective disinfection. Sanitation authorities believe that footbaths do not control athlete's foot. They feel that careful drying of feet and floor cleanliness contribute more to solution of this disease problem.

• **The manager's office.** The instructor's office is usually at the shallow end of the pool and centralized among operating functions. This simplifies managerial problems by enabling closer contact with employees as well as bathers. The office is about 10×12 ft and includes toilet, shower and closet. A long window with screen will permit supervision of swimming activities with ease.

A well-equipped first-aid room is adjacent to the manager's office. A storage room for miscellaneous swimming equipment opening off the pool, may include a service sink for general cleaning.

• **Checking.**—Checking facilities (for clothes and valuables to handle maximum anticipated load are required. C. P. L. Nichols, aquatic supervisor of Los Angeles Department of Recreation and Parks, recommends basket systems at municipal pools. (1948 Swimming Pool Data and Reference Annual, Hoffman-Harris, Inc., New York City). This is based on the fact that about 90% of the attendance will be children under 16 yrs. old. Some provision must be made as a hanger system for fully clothed patrons. Nichols suggests as a general rule that checking facilities be divided equally between baskets and hangers.

Baskets may be of wire, wood or sheet metal. They are numbered with correspondingly numbered discs or pins, which are exchanged for the clothes-filled basket. With elastic bands, swimmers wear disks.

Lockers may be provided, but space requirements make them unadaptable for large outdoor installations. In some cases, it may be desirable to use a combined basket and locker checking system.

Valuables generally are handled by two-signature, sealed envelopes. The patron seals his valuables in an envelope furnished by the management, signs and turns it in. Before he may obtain his envelope, he must sign again.

Water Purification: Pool Lifeline

From a health protection as well as patron attracting standpoint, most important facility at a pool is the water treatment plant. It must be adequate to maintain water clear, sanitary and equal to drinking standards at all times—particularly under maximum loads.

Nothing less than a recirculating system with filtering and disinfecting equipment is acceptable for a new pool. Old pools should be remodeled to include these essentials if they contain the no longer acceptable fill-and-draw water supply.

An up-to-date purification system includes: A surge and chemical treatment tank; hair strainer; recirculating pump; chemical or filter aid feeders; filters; and disinfecting apparatus. The piping system must deliver treated water to all parts of the pool as well as withdraw and return dirty water to the treatment plant rapidly. In some cases, a water heating system is essential.

• **Municipal or well supply.**—Water is taken directly from a municipal system or well drilled for that purpose. It is usually fed into the purification plant through a surge or make-up tank, the inlet pipe being at least 6 in. above overflow level to preclude back-siphonage.

Recirculating systems usually require about 20% new water per week to make up losses. Complete renewal may be advisable at intervals of two to four weeks.

• **Purification processes.**—The surge tank should be designed so that oils and surface accumulations are wasted. For outdoor pools, it may include a course screen to intercept leaves and floating debris. When water conditioning is required, chemicals may be added at the surge tank.

Most pools use aluminum sulfate and soda ash in purification. Use of these chemicals depends on type of filter medium employed. Some experts limit water treatment to filtration and chlorination; others insist that alum and soda ash conditioning are essential.

Added before filtration, alum forms a coating on filter surfaces and aids in straining and removing suspended matter. Feeding it by alum pot is no longer acceptable, but positive-fed chemical machines are an efficient solution to this problem. Ample facilities for dry, protected storage of chemicals are needed.

Since alum tends to increase acidity of water, soda ash (sodium carbonate) is required for holding pH between 7.2 and 7.6.

If water containing large quantities of calcium bicarbonate is to be heated, zeolite softeners or base-exchange apparatus may be installed to reduce hardness to a reasonable amount.

• **Hair catchers**—The outlet from surge tank is connected to a hair catcher. Duplicate baskets are provided. Catcher covers are held in place with two or three wing nuts for quick removal.

One favored hair catcher consists of a metal chamber with a removable cylindrical strainer. Water passes through the strainer from the outside (Fig. 8). Strainers are made of noncorrosive materials with openings, 1/10 to 1/4 in. wide. Slotted openings are more easily cleaned than perforations. Total area of openings is at least ten times that of inlet pipe.

• **Pumps**—Recirculating pump suction takes off from the strainer outlet. End-suction centrifugal units with electric drives are widely used, but side-suction, horizontal-split-casing pumps may be desirable. Pumps should be selected on basis of actual delivery against total operating head (filters, static and piping). Their capacity should be sufficient to turn pool contents over in an 8-hr period or less for public pools. Under heavy swimming loads, 6-hr turnover is desirable. Private pools may safely employ a lower rate.

With pressure filters, clear water is forced back to the pool by the recirculating pump. With gravity filters, units either are located above pool level or a return pump, drawing from a small clear well under filters, must be provided.

Recirculation pumps for sand pressure filters are selected with at least 50-ft head to maintain a high rate of water treatment when filters are dirty. Pumps for filter-aid installations have about 125-ft head.

Wherever possible, all pumps, filters and pipe lines are located below pool-water surface. Pumps above the pool must have priming devices.

• **Filters**—Pressure, open rapid sand gravity or filter-aid filters are employed in swimming pool purification plants.

Pressure filters—widely used—are suitable for small and medium-size outdoor installations (Fig. 9). A minimum of three units is provided. Sizes are determined by amount of water to be treated and filtration rate. Conventional rate is about 3 gal per sq ft per min. At some new pools, rates as high as 5 gal are used without chemical pretreatment, but operator skill is exceptionally good.

Rapid-sand gravity filters are preferred for very large outdoor pools. They are also prescribed for very hard waters where cementation of sand may result. Design follows conventional analysis for municipal water-treatment plants.

• **Filtering media**—Sharp, clean sand or quartz plus a gravel base is recommended filtering media for both pressure and gravity filters. Effective sand size is 0.4-0.5 mm. The uniformity coefficient should not exceed 1.75.

A prepared anthracite—light in weight and easy to backwash—is being used with increasing frequency for filtering media. Requiring about one-half conventional backwash rate, anthracite has a high demand for chlorine or bromine during first few weeks of operation. Demand, however, decreases with time.

Filter beds vary in depth from 36 to 48 in. Conventional practice usually calls for an 18-in. freeboard from surface to overflow pipe or trough to prevent loss of sand in backwashing.

Underdrains consist of either porous plates above channels, a grid-work of perforated pipes, or a deflector plate.

• **Filter control**—Rate-of-flow controllers, which are expensive, may be desirable on filters for pools holding more than 250,000 gal. They are desirable but not necessary for smaller pools. Loss-of-head gages are standard equipment for rapid sand filters.

Pressure filters are fitted with pressure gages on inlets and outlets to determine loss of head as well as back pressure. Each filter should be equipped with an air-relief valve. Readily removable manhole covers on pressure filters will permit inspection and repair.

• **Backwashing**—Pressure filters are backwashed by recirculating or by pumps drawing from the pool. Filters are usually cleansed—one at a time—at about four times the filtration rate. Drawdown is made up by adding clean water from the main supply.

Wash water is discharged directly to sewers or storm drains.

• **Piping for pressure filters**—Piping systems should be laid out so that city water is filtered before delivery to pool. Clarity requirements for good pool water are far more exacting than those for satisfactory drinking water.

Pressure-filter piping should provide: Normal recirculation through filters and pool; backwash or reverse flow; a by-pass for each filter; and drains to sewers through "broken" connections. Sight tubes should be included on waste-water lines.

Compact valve systems for control of pressure filtering are available. Hydraulically operated valves are generally desirable only on extremely large pools.

Piping systems are designed to minimize friction losses. Pipe capacities should usually be at least double theoretical values.

Flange or screw joints make for quick cleaning and repair. Blow-offs for removal of accumulated rust and sediment; openings for insertion of vacuum gages in pump-suction lines and Pitot tubes or meters for checking working-condition flows, and smooth spigots for water samplings are included. Pipe lines painted in different colors distinguish their functions. All pipes are pitched to low points with drain and clean-out plugs.

Inadequate pump or drain capacity for removal of wash water—a glaring defect at many existing pools—is one item that should be "over-designed." The wash-water sump should not be

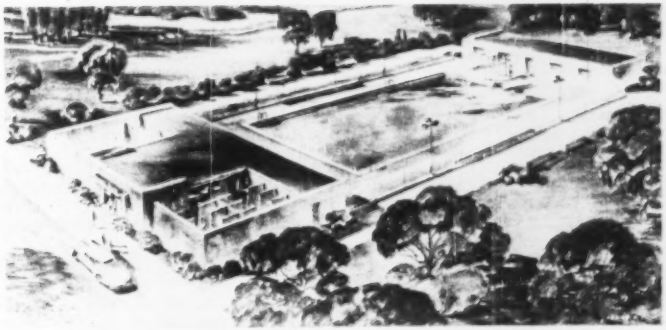


FIG. 7—OPEN-COURT BATHHOUSES contribute to reduced construction costs and permit entrance of sunlight. Water treatment plant and diving area are at far end of pool. (L. F. M. Park Pool, Atchison, Kansas)

smaller than 4x4x4 ft. When drains are not known to be adequate, careful investigation is called for.

In layout out the purification plant, ample working space around all units, adequate floor drainage, light and forced ventilation are essential. Floor slopes are 3 to 5 in. per 10 ft.

• Filter-aid filters—Developed for military water supply in the field, diatomite filters are being adapted to pool-water treatment. This is due primarily to compactness, which contributes to reduced first costs, both for equipment and inclosing structure. More data on operating performance and costs are needed, however, for appraisal.

The diatomite filter consists of a small vertical pressure tank containing a horizontal plate near the top that separates the tank into two chambers. Upper and lower chambers are for filtered and raw water. The plate carries porous hollow tubes suspended into the lower chamber. Valved inlet and outlet pipes are connected to the bottom and top of the tank.

In operation a slurry of diatomaceous earth or other suitable filter-aid powder is fed—both before and continuously during filtration—into the raw-water chamber. As water flows through the unit, slurry is deposited on the tubes, forming a porous cake through which water is forced under pressure. Suspended matter is caught on the cake. Clear water passes into the upper chamber and then to the pool.

As suspended matter and cake builds up, pressure to force water through the unit increases. Care in operation, therefore, must be exercised so that the filter is backwashed before excessive pressures are reached.

Two operations are generally required for backwashing: Loosening cake and actual backwashing. Cake is generally "knocked off" tubes by application of sudden air or water pressure. This is followed by backwashing to waste.

In selecting diatomite-earth units,

TABLE I—SWIMMING POOL STATISTICS AN

No.	Pool	Location	Dimensions, ft: Swimming	Diving	Wading	Water Volume, gal	Maximum Swimmer Load, Persons	Pool Surface, sq ft: Swimming	Diving	Wading	Total Deck Area, Sq ft	Depths, ft: Max.	Min.	Overflow Gutter	Water Treatm
1	L.F.M.	Atchison, Kan.	75x30			100,000	85	2,250				11.0	3.5	open	alum-ch-fl
2	Lions Park(1)	Atchison, Kan.	150x52	50x50		420,000	240	7,800	1,800			11.0	3.5	open	alum-ch-fl
3	Kiwanis-East York Memorial	East York, Ontario, Canada	100x75	40x75		320,000	1,330	7,500	3,075		11,250	9.5	2.5	sr	soda ash-alum
4	Municipal	Hereford, Texas	80x40	40x40		147,000	340	3,200	1,600		6,400	11.0	2.5	sr	soda ash-alum
5	Municipal	South Gate, Calif.	120x60			540,000	825	9,000		6	14,250	10.0	3.0	sr	ch-fl
6	Municipal(2)	Corvallis, Ore.	90x42	42x33	34x20	222,000	210	1,780	1,320	680	4,500	10.0	3.0	sr	soda ash-alum
7	Corps of Engineers	Grande City, Ill.	100x50			267,000	270	5,000			4,500	9.5	3.5		ch-fl
8	Municipal	Lindsborg, Kan.	85x60	35x60	20 dia.	250,000	250	4,500	2,100	314	6,500	9.5	2.0	sr	soda ash-alum
9	Memorial Park	Jefferson City, Mo.	115x75	50x75		420,000	750	8,625	3,750		7,038	11.0	3.25	open	ch-fl
10	Community Center	Jefferson City, Mo.	47.5x40	35x40		134,500	125	1,900	1,400		3,570	11.0	3.25	open	ch-fl
11	Technical High School	Oakland, Calif.	100x50			291,150	350	5,500			6,700	10.0	3.25	open	soda ash-alum
12	Municipal	Montezuma, Iowa	87x60	35x60	40x20	276,000	290	5,220	1,980	800	5,000	9.84	3.25	sr	ch-fl
13	Memorial	Eugene, Ore.	120x60			301,000	400	7,200			7,900	10.0	3.0		soda ash-alum
14	Bear Creek Park	Medford, Ore.	125x50			258,000	305	6,000			7,260	10.0	3.42		soda ash-alum
15	Municipal	Eagle, Ia.	105x42			165,000	220	4,410			3,990	11.5	3.25	open	ch-fl
16	University of Conn.(3)	Storrs, Conn.	75x42			155,250	75	2,010			2,010	12.5	4.0	open	ammonia-alum
17	Sunnyvale Beach, Inc.	Lucas Co., Ohio	135x75		150x75	400,000	1,000	11,250		1,125	5,400	11.0	3.0	open	soda ash-alum
18	Municipal	Redding, Calif.	110x65	55x65		445,210	580	7,150	1,575		10,800	12.0	3.5	sr	ch-fl
19	Municipal	Fayetteville, N. C.	120x60			245,000	570	7,200			4,260	10.0	3.25	ro	soda ash-alum
20	B. T. Washington Park(3)	Oklahoma City, Okla.	100x35	55		190,000	320	4,500			7,500	10.0	3.0	sr	ch-fl
21	Municipal(3)	Newhall, Calif.	105x35	35x25		211,000	300	3,675	875		5,900	10.0	2.5	open	soda ash-alum
22	Army Post	Fort Riley, Kan.	65x60	35x60		252,000	220	3,900	2,100		5,635	10.0	3.5	open	ch-fl
23	Municipal	Helper, Utah	80x60	40x60		354,000	205	4,800	2,400		7,780	9.5	1.5	ro	ammonia-alum
24	Gold Star Mother's Memorial	Cambridge, Mass.	70x42	20x42		153,360	312	2,940	840		6,200	8.5	3.6	r	soda ash-alum
25	Memorial Recreation Center(3)	Owensboro, Ky.	200x125			600,000	1,282	14,750				10.0	0.5	r	soda ash-alum
26	Municipal(3)	Salinas, Calif.	55x80	45x50		214,000	400	2,750	2,250		3,400	11.0	3.5	sr	alum-ch-fl
27	Municipal	Barre, Vt.	150x75			563,000	1,200	11,250			4,200	10.0	3.25	open	alum-ch-fl
28	Municipal	Great Neck Estates, L. I., N. Y.	100x50			295,000	200	5,000			5,100	10.5	3.25	open	ch-fl

(1) Indoor pools, all others are outdoor. Pool shape—(2) T, (3) L, (4) trapezoid, (5) elliptical; all others are rectangular. (6) diatomite filter. (7) filters to be installed.

impartial engineers recommend that filtering areas be ample. Not over 2 gal per sq ft per min is a reasonable rate upon which to determine filter area. Rates as high as 4 gal, however, are approved by some state health departments.

Grade of diatomaceous earth used affects filtration performance. Filter runs are apt to be short with fine grades of diatomaceous earth.

Disadvantages encountered with some diatomite filters, include: Short filter runs, high power costs, tube plugging, air binding and corrosion. Solutions to these problems are, however, being developed.

Most recent development is said to be an improved filter-aid powder made from heat expansion of perlite ore. This is mainly aluminum silicate, with an effective size of about 40 microns. Several pool operators have reported that this material is more satisfactory than either diatomite for the mechanical filter or alum for the sand-gravel installation.

• **Disinfection**—Only two chemical elements—chlorine and bromine—are acceptable for disinfecting pool waters. Superiority of these chemicals lies in their ability to maintain long-lasting bactericidal residuals in water.

Chlorine equipment should be capable of maintaining a free available residual of 0.5 ppm (as opposed to chloramine residuals) throughout the pool when in use. Sufficient capacity should be available to apply chlorine in amounts up to 12 ppm (or more) to take care of unusual demands. This means that disinfecting equipment should have a capacity of about 1 lb of chlorine per 10,000 gal of water recirculated in 8-hr turnover.

Chlorine is available either as a pure gas, delivered in steel cylinders, or as sodium or calcium hypochlorite. Equipment for applying gas chlorine is well-standardized but manufacturers' recommendations for handling the gas should be followed with extreme care.

ONSTRUCTION COSTS (AN ENR SURVEY)

...ssing Room sq ft		Checking Facilities		Sanitary Facilities						Date Built	Cost $	Remarks	Designer
...en	Women	Men	Women	Men Toilets	Men Urinals	Men Showers	Women Toilets	Women Showers					
		Baskets											
900	900	200	100	1	1	2	2	2		1948	50,000	Open-top dressing rooms (all masonry)	K. H. Locke, Kansas City, Mo.
		Baskets											
1,150	1,120	720	360	4	3	7	4	7		1948	115,000	Open-top dressing rooms (all masonry)	K. H. Locke, Kansas City, Mo.
300	300			2	2	2	2	2		1947	65,000	Dressing & Spectators' seats separated by wall	Parrott, Tamblyn & Witmer, Toronto, Canada
350	350	Baskets & shelves		2		2	2	2		1948	49,200	Enclosed dressing rooms, filters, mechanical, Filtrous block washing (not) adjacent	Parrott & Cooper, Lockport, Tex.
3,000	3,200			6		12	6	6		1948	290,000	Filing to resist subsurface water pressure. Bathhouse cost $140,000 included.	Viles & Lotz, Los Angeles, Calif.
742	758	512 sq ft		2	2	6	2	4		1948	94,000	Washing pool segregated; stadium bleachers. Bathhouse cost $15,000 included.	C. H. Jenkins, Corvallis, Ore.
Future		Future				Future				1948	74,000	Tied back high with embankment to account of ground water and high west powers	Corps of Engineers, Washington, D. C.
340	372			1		4	2	6		1948	58,000	720 sq ft unpaved running area	K. W. Walker, Salina, Kans.
500	500	Baskets, 225 sq ft		7		9	4	6		1948	146,500	5,740 sq ft of sand beach. 3-ft. R. runnels, open dressing rooms	J. C. Schmidt, Kansas City, Mo.
255	255	Baskets & rack, 115 sq ft		2		3	2	3		1948	60,570	2,150 sq ft of sand beach. 3-ft. R. runnels, open dressing rooms	J. C. Schmidt, Kansas City, Mo.
544	544	Baskets & lags		4		7	5	7		1948	113,000	Water temperature controlled by push-button facilities in pool bottom.	Johnson & Bonnet, Oakland, Calif.
630	630			3	3	5	3	4		1947	90,000	Washing pool separate, open dressing rooms. Part of recreation center	Stanley Engrg. Co., Muscatine, Ia.
1,152	1,152	500 sq ft		2	3	6	4	6		1947-48*	130,000	Separate wading pool, spectator bleachers, pool-water heated	J. W. Cunningham, Portland, Ore.
1,260	1,260	500 sq ft		2	3	6	4	6		1948	115,000	Separate wading pool, spectator area, over bathhouse, pool-water heated	J. W. Cunningham, Portland, Ore.
300	300	Baskets		3		5	2	2		1948	Included	4 picnic tables to 20x80 spacing around pool.	Carnegie & Smith, Baton Rouge, La.
In bathhouse				determined for other facilities						——	——	Built with bathhouse-concession, pool-water heated gymnasium, 70'-0" dia. T. compartment-type pool	F. C. Tech, Hartford, Conn.
550	550	400 baskets		4	4	5	3	7		1948	175,000	Dress sand beach, dressing stalls for men and women.	R. C. Rowe & N. F. Sharvin, Toledo, O.
1,440	1,440	Baskets		4		5	4	44		1948	127,850	Outer showers for men	W. W. Green, Berkley, Calif.
240	240	Baskets		1	1	2	2	2		1948	55,000	Open dressing rooms	Sayler, Stevenson & Valve, N. Y. C. F. Elwood Allen Organization, N. Y. C.
1,064	1,064			2	3	4	4	6		1948	70,500	Open dressing rooms with 4-ft canopy around perimeter.	H. E. Chase, Oklahoma City, Okla.
										1948	88,620	Lawn & sand areas, bathhouse to be added	Wilson & Williams, Los Angeles, Calif.
180	180	144 lkrs	36 lkrs	3		4	2	2		1948	64,0005	Stalls for women's dressing rooms	Corps of Engineers, Washington, D. C.
				2	2	4	4	4		1948	60,000	Bleachers for men's bathhouse to be built	John Bolt, Hazel, Ky.
												Cabanas for women's dressing rooms. Watch-dressing cabins to be added.	John Bolt, Hazel, Ky.
340	340	300 baskets		2	3	5	4	4		1948	113,340	Overflow gutter only at one end; concrete wall around pool; observation deck over bathhouse	Anderson & Beckwith, Boston, Mass.
1,365	1,365	644 baskets		5	10	15	10	25		1948	151,350	12,000 sq ft sand beach	Meriwether & Mayne, Lexington, Ky.
1,040	1,040	Baskets & lockers		4		8	4	4		1948	134,000	Rolling door and glass wall above along southside gives effect of outdoor pool in winter?	J. H. Cline Co., Oakland, Calif.
1,050	1,050	Baskets		3	2	5	5			1948	84,340	Dressing booths for women. 15,000 sq ft turf on bathing area	Sayler, Stevenson & Valve, and F. Elwood Allen Organization, N. Y. C.
780	780	Lockers		2	2	6	3	5		1949	130,000	Dressing booths for women. Turf sand deck surrounding pool	Sayler, Stevenson & Valve, and F. Elwood Allen Organization, N. Y. C.

...ank; ...ckers; ...ecirculating systems. Turnover is 8 hr for all pools except No. 16 which may be operated at 6 hr or more; ...8 pool only; ...ar; ...ommercial; ...ne; ...ndicates; ...reated.

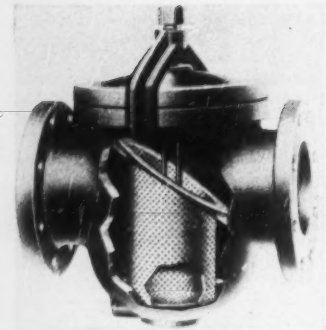


FIG. 8 HAIR CATCHERS on pump-suction lines are a "must." (McMeat Mfg. Co., Chicago, Ill.)

Since chlorine is a poison gas, feeding equipment and storage cylinders must be in a separate room, with an exhaust blower with outside switch; and an air intake at ceiling height and outlet at floor level.

Hypochlorites in water solution may be fed by reliable, accurate commercial equipment. Usual strength of sodium hypochlorite (liquid) is 10 to 15% chlorine. Calcium hypochlorite should contain 70% chlorine. Use of these chemicals is recommended because of more uniform strengths.

Chlorine is continually applied to recirculated water preferable to filter influent. This will allow contact time for disinfection as well as tend to keep filter beds clean.

Bromine is claiming increasing favor as a swimming-water disinfecting agent, particularly in Illinois. It is preferred by some operators because bromine is easy to handle, the residual is said to be stable, and swimmers seem to complaint less frequently of odors and irritation.

By bubbling water through bromine, the solution, which is formed, is usually injected into filter influent (Fig. 10). Bromine proponents suggest that feeding equipment should be designed to maintain 0.5 ppm residuals; maximum capacity should permit injection at rates as high as 1.5 ppm.

• Circulating water—Water is circulated in pools by downflow or upflow. With downflow, circumferential inlets are located 1.5 to 3 ft below water surface and drawoff is at deepest point of the diving area.

The upflow system (finding increasing favor) consists of inlets around the pool near the bottom. With water level 1 in. above the lip, dirty water is taken off by the overflow trough and returned to the purification plant. Provision is made for occasional outflow from the bottom to remove sediment. One reported disadvantage is need for a large surge tank.

Inlets are designed as adjustable orifices; each line may have a valve to regulate flow. Inlets are located to produce uniform circulation of fresh and purified water, maintain disinfectant residual and eliminate "dead spots" in the pool. They are submerged to prevent disinfectant odors. Recommended practice calls for a maximum inlet spacing of 15 ft.

Pools should be drainable in not more than four hours. Drains are usually multiple-outlet, low velocity type, with main drains in the bottom at the deepest point. Drain spacing is 20 ft apart and 10 ft from walls.

Gratings should contain openings equal to four times that of the outlet pipe, to reduce suction currents.

Drains set in side walls at the deepest point are more accessible, less likely to clog than a floor-flush drain, and more easily repaired.

• Water temperature—Desirable water-temperature range for mass recreation is 76-78 deg F, for instruction 80-83 deg, and for competition, not less than 74 deg.

Water temperature is raised by heat exchangers or a panel-heating system. Exchangers to heat all or part of the recirculated flow must have ample interchange surface. When steam or hot water is the heating agent, automatic thermal control is desirable. Exchanger design should facilitate easy removal of interior parts for cleaning.

A panel-heating system has been installed for the Technical High School pool at Oakland, Calif. (ENR April 14, 1949 p 68). Hot water from a gas-fired boiler is circulated through copper-tube coils embedded in the pool-bottom slab. With balanced operation (equal flow controlled by valves), this system is reported to heat pool water uniformly.

To check performance, thermometers should be included in heater discharge and pool inlets.

Another problem may be just the reverse—how to cool water during hot spells, for water temperature should not exceed 78 deg. To hold temperatures below this maximum, water may be cooled by exchangers, louvred towers with forced-draft fans or spray inlets at the pool.

Sprays usually are the least expensive solution. When about 20% of the water is passed through them, a temperature drop of 4 to 5 deg may be expected.

Some chlorine, however, is lost by spraying, possibly also increasing chemical odor.

• Spectator space—A spectator gallery is essential where competitive events are held, and encourages visitors to become patrons.

The gallery should be parallel to, separated by a high curb from and not over-hang the pool, and be located along the west or southwest side so that there is no glare from the afternoon sun. Permanent construction such as reinforced concrete is recommended.

Spectator galleries must have their own toilets for men and women.

• Keeping the pool clean—A suction-cleaner system consists of a series of inlets around the pool about 9-in. below water surface, piped to the recirculating pump. Piping is designed to minimize friction losses. A graduated-stem valve on pump inlet is desirable for throttling inflow to maximum vacuum efficiency.

A slotted opening with brushes on a long pipe handle connected to inlets by flexible hose is passed slowly over pool floor (Fig. 12).

• Indoor-outdoor pools—Because outdoor pools in northern climates can be used only about three months a year, a few projects are built inclosed but with features for "opening up" during summer (Fig. 11). These may be a removable roof or a sidewall composed of a series of large, overhead or airplane-hanger doors. Doors open a spacious sunbathing deck. Some designers feel that the large investment required for an outdoor pool—used for only a short period—justifies additional cost of inclosure.

What The Operator Should Know

Proper operation of a swimming pool, from an overall view, is just as important as efficient design. Some sanitary experts contend that operation is more important because it directly affects patrons. This opinion stems from enlightening experience. Values of best designed pools have often been dissipated by indifferent supervision. Conversely, top-notch operation has done much to offset defects of otherwise inferiorly built pools.

Best-managed pools have these operation objectives:

1. Swimming waters meeting potability standards of the U. S. Public Health Service at all times.

2. Spic and span appearance of the pool, bathhouse and surrounding areas.

3. Constant and complete protection against disease transmission.

4. Minimum accident rate.
5. Maximum economy.
6. Stimulation of interest in swimming and diving.
7. Increased financial return.

First duty of a pool manager is to familiarize himself not only with the water-treatment plant and recirculation system but also with basic principles of water chemistry. This know-how is essential. He must be capable of adjusting treatment readily as conditions change and problems arise to have clear, effectively disinfected water at all times.

If assistance is needed in mastering water-purification techniques, managers may call upon county or state health departments. These agencies usually have a sanitary engineer to give technical guidance.

• **Keep strainers clean**—If a coarse screen is in surge tank, sticks, leaves and other debris will be intercepted and load on the hair strainer will be reduced. Coarse screens should be cleaned at least weekly.

Lint strainers are opened and the dirty basket removed at regular intervals, varying with load. Managers should set up a strainer change-and-cleaning schedule that will minimize head loss by clogging.

• **Maintaining the pump**—For best service, recirculating pumps require a small amount of maintenance. Lubrication as directed in manufacturer's instructions; packing glands tightened at regular intervals to permit just a slight drip but not over-tightened to cause binding. Repairs to motors and pumps should be made only by competent electricians and mechanics.

• **Water purification aims**—Purification plants should be operated at all times so that swimming water:

1. Meets U. S. Public Health Service bacteriological standards for drinking supplies;
2. Is effectively disinfected to destroy bacterial contamination;
3. Shows a slightly alkaline reaction (pH of 7.4 is considered ideal);
4. Is clear and sparkling; and
5. Has no noticeable color, taste or odor.

• **Check bacteria count**—Bacterial contamination is shown by presence of coliform organisms that come from human body excreta. To determine if these organisms are being satisfactorily removed in purification, bacteriological analyses of pool water should be made at regular intervals—at least weekly.

Three bacteriological tests (Standard Methods of Water Analysis, American Public Health Assn., New York, N. Y.) are employed: Coliform test, total bacteria count and streptococci test.

Coliform test, which indicates presence of intestinal organisms, is an index of human contamination.

Total bacteria count reveals concentration of all types of bacteria per unit volume of water. Counts higher than 200 per milliliter indicate unsatisfactory water purification.

Streptococci test supplements the first two tests. It is an indication of presence or absence of organisms that may cause respiratory diseases. This test is not usually made by health-department laboratories.

Water samples should be taken only when pool load is heavy. Analyses of samples collected during periods of light use do not provide a true picture of effectiveness of water purification. Proper technique for collecting samples may be found in texts on water-purification practice. Good practice calls for collection of two samples, one at each end of pool. Samples are taken near water surface.

To obtain the most accurate bacteriological analysis, managers of pools should utilize services of local laboratories. Such arrangements are preferable to mailing samples to state laboratories because time between collection and analysis is decreased.

• **Carry a safe residual**—To prevent bacterial contamination, swimming waters always carry a free available chlorine residual ranging from not less than 0.3 ppm to not more than 0.7 ppm after 2-0 min contact time. Some experts report that 1.5 ppm average residuals have produced superior results without adverse body effects. Residual is amount of chlorine that remains in water and is available for disinfection.

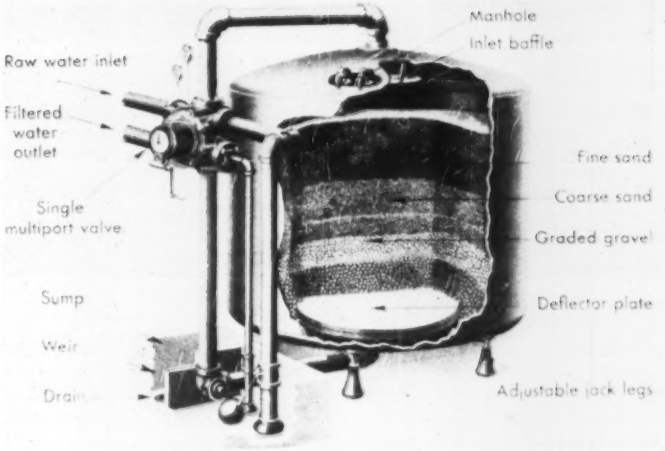


FIG. 9. PRESSURE FILTERS are pipe-connected and valve-controlled to facilitate filtering and backwashing. (The Permutit Co., New York City).

Disinfecting agents applied to filter influent, may be either gas chlorine, sodium or calcium hypochlorite, or bromine. For a 100,000 gal pool under average patronage the following approximate amounts of chemicals are needed per day for effective sterilization: Gas chlorine—one lb; 16% commercial sodium hypochlorite solution—one gal; 5% sodium hypochlorite—2.5 gal; 70% hypochlorite—1.5 lb; and liquid bromine—2 lb. Chloride of lime should be dissolved and settled before use to keep undissolved particles of lime out of swimmers eyes.

Liquid chlorine, hypochlorite or bromine solutions—machine-fed continuously to recirculated water—are considered best disinfection agents. Intermittent disinfection doesn't insure a reliable chlorine residual throughout pools.

Maintenance and repair of chlorinator units should be done in accordance with manufacturer's instruction. The manufacturer's representative should always be called in to repair gas chlorinators.

• **Testing for chlorine**—A comparative type of chlorine-residual testing kit should be available at every pool. Colored glass-disk standards are preferable to colored solutions, which lose color, particularly in sunlight. Recommended standards are: 0.0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.7, and 1.0 ppm.

Chlorine residual tests should be made on samples taken from near pool inlet and outlet at least twice a day. Instructions for the test may be found in health-department manuals and text books.

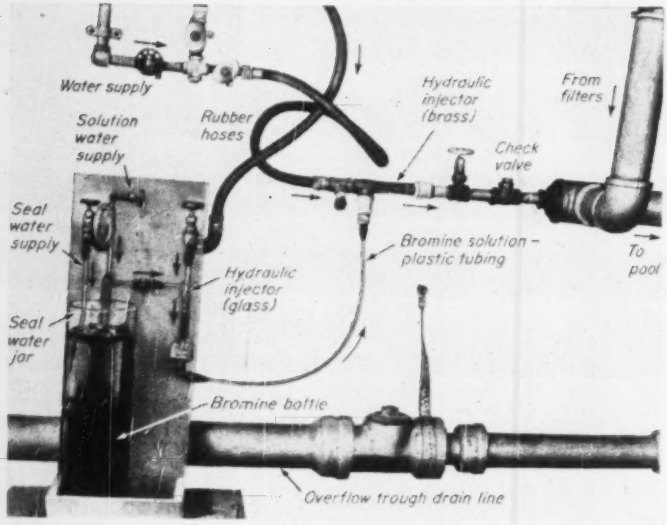


FIG. 10 BROMINE FOR DISINFECTION. With simple equipment, bromine is bubbled through water; the resulting solution is injected into filtered-water return to pool. (Illinois Department of Public Health photo.)

If free available chlorine residuals cannot be maintained due to excessive ammonia or organic matter, chlorine feed is stepped up to give a 2-ppm combined residual. This insures effective disinfection.

Some operating improvements may be needed to obtain free chlorine residual. These may include: Elimination of use of ammonium alum or other ammonium compound; full enforcement of the rule that swimmers take, nude, soap shower before entering the pool; maintaining crystal-clear water; and superchlorination of pool when not in use. Superchlorination is addition of excessive chlorine to oxidize all ammonia in water.

• **Bromine disinfection**—Bromine is being successfully employed for disinfection at about 10% of pools in Illinois. Recommended residual varies from 0.5-0.7 ppm (tested with chlorine color standards) which is said to provide a bactericidal effect equivalent to that of chlorine. Reports indicate that about as much bromine (by weight) as chlorine gives the same residual.

Bromine should be handled with caution because it causes skin burns and gives off irritating fumes when exposed at room temperatures.

The suggestion has been put forward that combined application of chlorine and bromine might result in improved operation of purification plants.

• **Swimming waters are alkaline**—They should have a pH varying between 7.2 and 7.6 and an alkalinity range of 50 to 50 ppm. If pH drops below 7.0, coagulation may be incomplete, considerable eye irritation will be reported by swimmers, and cloudy water may result—particularly after make-up water with normal alkalinity is added to the pool.

A pH-testing kit should be available at all pools. Recommended standards are 7.0, 7.2, 7.4, 7.6, 7.8 and 8.0.

When alum or sulphate of alumina is the coagulant, alkalinity will decrease steadily. In addition, gas chlorine or liquid bromine decreases pH.

To maintain pH above 7.2 soda ash is added through positive chemical or pressure-solution feeders.

If soda ash is not obtainable, sal or washing soda may be fed to raise pH. Lime is not recommended because particles will pass through filters causing turbidity in the pool. Also, some lime will be deposited in filter sand.

Lye (caustic soda or sodium hydroxide) may also be applied to raise pH and provide proper alkalinity. It will raise pH faster than soda ash for equal weight. But extreme caution must be exercised in handling lye to prevent skin burns and eye injury.

Some operators find it difficult to maintain pH low enough. This condition may result when make-up water has high alkalinity and pH, or chlorinated lime or sodium hypochlorite or salt-electrolysis chlorinators are used, all of which tend to raise pH.

When alum dosage does not offset increased alkalinity, dilute hydrochloric or sulfuric acid may be added to hold pH within the 7.2-7.6 range and alkalinity to 30-50 ppm. Amount of acid to be added daily is determined by experience.

Considerable care must be exercised in applying acid to prevent burns to both operators and swimmers. It should only be added when absolutely necessary. This practice is not recommended for routine operation.

Sodium bisulphate—an acid-reaction compound—is being employed at many pools to lower pH. Its use is safer than acid treatment.

• **Crystal clear water**—To maintain optimum clarity, a turnover of not more than 8 hr is common practice. (Turnover is number of hours required to treat entire pool content once.) During periods of heavy swimming load, a 6-hr turnover is desirable—a recent design trend.

One test for water clarity provides that a 6-in. black disk on a white background placed on pool bottom at the deepest point shall be readily visible from decks up to 10-yd distances measured parallel to the long dimension of the pool. Another, more severe, test stipulates that "head" or "tails" of a dime on the bottom at the deepest point be distinguishable from the deck above.

Color in pool water may be of either organic or inorganic origin. Leaves, roots and algae may impart a greenness; manganese and iron produce a characteristic reddish black color on walls and bottom. Color removal depends on improved coagulation and filtration plus more effective disinfection to oxidize organic material.

• **Coagulating pool waters**—"Waterworks" alum (aluminum sulphate) is a standard coagulant for swimming-pool waters. Ammonium alum is not recommended; it interferes with disinfection.

Alum dosage varies from 1-2 oz per sq ft of filter area. It is applied immediately after backwashing during an 8 to 10-hr period. Preferred application is to surge tank or pump-suction line. This permits violent mixing in the pump and results in better floc formation before filtration.

Care must be taken to apply just the right amount of alum for effective coagulation. If too much is fed into the purification system, it will pass through filters and settle out in the pool. If too little is applied, water may be turbid, and organic matter will penetrate and foul filters.

• **Chemical feeders**—Granulated plain

alum for coagulation and soda ash for pH control are generally fed to older systems by pressure pots. While considerable difficulty due to clogging and corrosion is reported with this type of feeder, it operates satisfactorily if properly maintained. Inlet and outlet lines must be kept free of deposits. This is done by circulating water continuously through pots after chemicals are discharged. Most pools in the mid-west have discarded solution pots.

Excellent service may be obtained from commercial chemical-solution feeders, many of which are capable of accurately injecting different solutions at varying rates.

• **Filtration practice**—Filtration is done by alum floc deposited on the sand-filter surface.

Pressure units are conventionally operated at 3 gpm per sq ft of filter area with alum as the coagulant. Rates as high as 5 gpm through pure quartz sand are successful at some pools without chemical coagulation. Such high-velocity operation must be preceded by mechanically tightening filter beds. This may be done by sudden application of full water pressure to the filters.

Filters are commonly operated only 8 to 10 hr per day. This, however, is not considered best practice. Some experts insist that filtration systems must function 24 hr a day to maintain clear water. Continuous operation is considered essential when swimming load is very heavy, turnover exceeds 8 hr or algae contamination impends.

Filter runs, some engineers believe, should be longer than generally obtained. Four to ten-day runs are considered optimum at most pools, with resultant savings in water, chemicals and cleaner swimming water.

• **Washing filters**—Filters are backwashed at least once in ten days. Minimum rate is 10 gpm per sq ft, but a 15-gal rate is preferable.

Sand in pressure filters generally must be replaced or thoroughly cleaned every 7 or 8 yr. But this life will be reduced by inadequate care and maintenance. New sand should be virtually pure silica with an effective size of 0.4-0.5 mm and a uniformity coefficient of not more than 1.75. Buyers should insist on certified mechanical analyses when filter sand is purchased.

• **Pressure-filter troubles**—Two physical conditions may hamper proper operation of pressure filters: Air binding and filter bed deposits.

Air bubbles at inlets, cloudy pool water and noises in filter influent pipes are symptoms of air collection in top of filter shells. Cloudy water results from disturbance of clarification on the filter surface by air-water mixture. Air accumulation in filters must be combatted by eliminating source of leakage and providing air releases from the top of each filter shell.

Pump suctions should be checked for leaks as well as adequate size. If suction is too little, it may be desirable to install a larger diameter pipe. Pump packing should be checked for tightness, a slight drip being desirable to insure against overtightness.

Because automatic air releases are reported to be unreliable, an inexpensive, manually operated release—consisting of a ¾ or ½-in. pipe and a gate valve at the lower end—may be installed from top of filter shells down to within easy reach (not from the influent piping). The valve permits releases of air at regular intervals.

Filter failure may result from organic deposits in the sand layer, a condition caused by inadequate backwashing. If this occurs frequently, backwash rate, which should be four to five times normal filtration rate, should be checked. A special pump may be desirable to furnish sufficient backwash water for effective cleansing.

Pressure filters should be inspected regularly. Inspection procedure:

1. Backwash filter thoroughly.
2. Drain water well below sand surface.
3. Open manhole, being careful not to drop cover onto bed. The filter bed should be level without depressions or puddles. It should lie against the shell.
4. Dig a trench, at least 1 ft deep, in the sand and carefully remove each layer so that it may be examined critically.

If organic deposits are found in the sand, they are removed by:

1. Dropping water level 4 in. above the bed.
2. Adding a pound of lye or sodium hydroxide per square foot of filter area.
3. Allowing filter bed to stand overnight.
4. Draw off solution.
5. Repeat the process.
6. Backwash filter thoroughly.

Filters are not to be drained through a plug in the shell unless a valve has been installed previous to treatment. Rubber gloves should be worn by workmen.

Lye or sodium hydroxide treatment will not open clogged underdrains or nozzles. This is usually done by passing acids with inhibitors through underdrains, a procedure to be carried out by commercial specialists. In extreme clogging, it may be necessary to remove sand and gravel from filter shells and clean or replace underdrain nozzles.

Filter sand may become encrusted or cemented where water is hard and excessive amounts of alum and lime have been used. This condition generally permits water to pass downward through holes without filtration. The solution is to replace filter sand.

Application of polyphosphates to stabilize water after filter beds are reconditioned may be required to prevent re-clogging.

• **Filter-aid filters**—Diatomite filters are operated in two ways: Filter aid (diatomaceous-earth slurry) is added at beginning of the run and injected continuously during filtration. Filter aid, caught on the cylindrical porous elements, is the medium on which suspended and colloidal material is strained out. Dosage is usually about 1.5 oz per sq ft of strainer surface area.

Standard filtration rate of diatomite units is about 2 gpm per sq ft but this will vary upward with character of water and type of aid used. Filtration generally is continued until pressure loss between inlet and outlet of filter equals about 90% of pump capacity.

At end of run, flow through filter is reversed; dirt and filter aid are backwashed to waste. A backwash rate equal to filtration rate usually insures adequate cleansing.

Length of diatomite-filter runs depends on turbidity of water. Runs as long as 10-12 hr are not uncommon.

The finer particles resulting from heat expansion of perlite ore are in use at a number of pools in place of diatomite. Perlite-powder dosage is 0.5 oz per sq ft of filter area.

Head loss through clean tubes is recorded at least once a month as a precaution against clogged tubes. When head loss becomes excessive, tubes are removed and cleaned chemically or mechanically.

Abrasion of filter shells is reported to be more serious with diatomite than with sand filters.

• **Watch your water temperature**—It plays an important part in providing a satisfying swim as well as in controlling algae growths. It should not be warmer than 78 deg F. Best swimming conditions occur when air temperature is 2-8 deg higher than that of water.

During hot summer days rising water temperature may become a problem at outdoor pools. This may be combatted by suspending canvas strips over the pool, use of sprays in the pool, heat exchange equipment, or cold makeup water.

In one large pool (250 x 125 ft), two sprays through which 1,500 gpm of water is circulated at night reduce

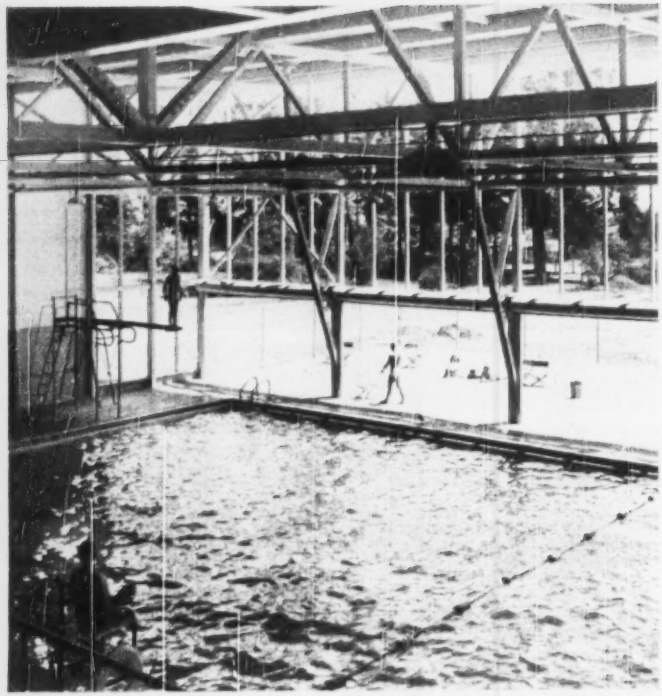


FIG. 11 INDOOR-OUTDOOR pools with overhead doors and glass walls on the right exposure are usable throughout the year (Municipal Pool, Salinas, Calif.)

ats temperature to 75 deg. without difficulty. Rate of temperature reduction by sprays depends on humidity and wind conditions.

• **Algae a problem**—Most outdoor pools have algae troubles, occurring most frequently in heavily wooded areas. The best practice is prevention. This can usually be done by maintaining 0.5 ppm. free available chlorine residual in all parts of the pool and by periodic, systematic application of copper sulfate to give 0.5 ppm. dosage.

Algae is of two types: Free floating or clinging. The former type usually develops quickly and is easily treated and removed. Clinging algae, however, exists itself to pores and crevices.

Presence of algae in pools is usually forecast by a sharp rise in pH—from 7.5 to 8.0. If treatment is carried out at this indication, algae development is easily forestalled. Without remedial treatment, algae growths lessen effectiveness of disinfection and contribute to increasing turbidity.

Algae can be readily eliminated by superchlorination, copper sulphate or quaternary ammonium compound treatment (or a combination). These treatments are done when the pool is not in use.

Superchlorination, which consists of applying chlorine at the rate of 10 ppm. to maintain a free available residual of 2.5 ppm., is the most effective method of killing algae. When the desired residual has been obtained throughout the pool, the chlorinator is shut off. Recirculation is continued until residual drops to less than 1.0 ppm. Swimming is then resumed.

Copper sulphate is applied by dragging a bag of crystals through the water or by broadcasting the chemical on the surface. About 1 lb. of copper sulphate per 40,000 gal. of water is usually needed.

Algae that clings to pool walls and bottom is loosened with weighted brushes. It is then removed by suction cleaning.

When the pool is emptied for cleaning, it is desirable to scrub walls and bottoms with a 5% solution of copper sulphate to preclude algae troubles.

Other operating factors contributing to algae reduction are: Clear water with a temperature less than 78 deg.; rubber base paint on walls and bottom; free chlorine or chloro-bromine residual; and effective recirculation.

• **Cleaning pools**—Swimming pools are effectively cleaned with liquid sodium hypochlorite, which is preferable to strong acids. It requires a minimum of scrubbing and does not injure paints or finishes.

Another very strong disinfecting solution may be made up in a 50-ga. container of water to which is added 4.5 lb. of high-strength calcium hypochlorite (10,000 ppm.). The solution is then sprinkled on walls and bottom of the pool. After standing for 5-10 min. practically all algae and stains will disappear. Some scrubbing is required. When pool surfaces are clean, they are carefully hosed down, dirty water being drained to waste.

Pool bottoms are cleaned at regular intervals when pools are in use. This is done by vacuum cleaners, weighted or flap-plate brushes.

Two types of vacuum-cleaner systems are utilized:

1. A portable, motor-driven pump (Fig. 13) with a hose connecting the suction inlet and one end of a long pipe with a long, narrow opening at the other. The pipe serves as a handle to pass the opening over the bottom while settled particles are drawn into the slot by suction. Pump is mounted on wheels so that it may be rolled along the deck.

2. Up-to-date recirculation systems include piping from pool to pump suction for vacuum cleaning. Outlets at the pool are usually about 8-in. below water surface and not more than 40 ft. apart. A 50-ft. hose with a long-handled vacuum cleaner is connected to outlets in sequence and sediment is removed by passing the cleaner over the bottom.

A diving helmet and air pump are provided at some large pools. With this equipment the pool is cleaned by a lifeguard walking on the bottom.

Some operators prefer a long-handled weighted brush for cleaning pool bottoms. Sediment is pushed to the main drain. It is then removed by filtration or discharged to waste.

When upflow recirculating pools are not in use, bottom sediment is removed by injecting water parallel to the floor from inlets near the bottom at slight pressure. Currents set up direct sediment to slightly opened floor drains. Some operators report that this effectively removes precipitated particles, making suction cleaning unnecessary.

• **Bathhouse sanitation**—As insanitary swimming pools are potential sources of ear, eye, skin, respiratory and intestinal infections, managers must constantly guard against disease transmission by maintaining cleansing and disinfection of all facilities. This will embrace in addition to proper operation of purification plant—daily disinfection and washing of pool decks,

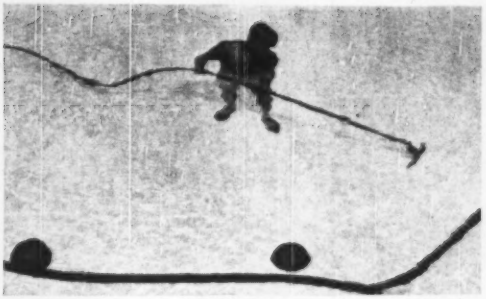


FIG. 12 SEDIMENT on pool bottom is picked up by suction cleaner. Floats support hose connection to pump-suction inlet. (Arena Pool, Cincinnati, Ohio).

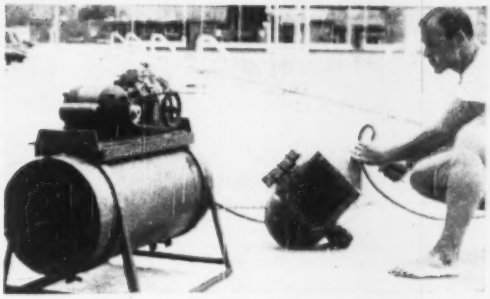


FIG. 13 PORTABLE PUMPS AND TANKS like this one are available for cleaning pools without built-in suction systems as at left. (Westlake and Latter photo).

bathhouse floors, and toilets; enforcement of nude, soap and warm-water showers for bathers before swimming; and rejection of patrons with obvious infections or open cuts.

The overflow trough should be cleaned at least weekly. Tri-sodium phosphate powder may be used with mopping to clean troughs. It is also effective in removing waterline grease marks, the two operations being done simultaneously.

One effective way to control athlete's foot is to scrub decks and bathhouse floors daily with a 0.5% available chlorine solution. This is followed by thorough hosing down.

Other methods of floor disinfection include:

1. Soap and hot-water mopping followed by an application of chlorine, creosote or copper sulphate.
2. Use of a combined cleaner and disinfectant, such as a detergent and benzylated phenols.
3. Mopping with hot, soapy, strongly alkaline water.
4. Hosing down floors, scrubbing with a stiff brush using one-half of a 13-oz. can of lye dissolved in a bucket of hot water, and a final hose rinse.

Diving board mats are treated daily with a strong disinfectant. Rubber mats or varnished-sand surface are considered more desirable than coco matting an excellent medium for bacterial growth.

Toilet, urinals and lavatories are washed and disinfected daily. Solutions with 600-ppm available chlorine or the equivalent may be used.

If lockers are provided in the bathhouse, they should be frequently washed and disinfected from sanitation viewpoint as well as for vermin and odor control.

Wooden walkways and rubber mats in bathhouse should be eliminated. They interfere with floor cleaning and provide an ideal place for bacteria and fungi to multiply.

• **Enforce swimmer cleanup**—One of the most important—yet most difficult items to obtain in swimming pool sanitation—is swimmer cleanup. Every swimmer should be required to take a nude hot water and soap shower and then report to a shower-room attendant before entering the pool (Fig. 15).

An adequate supply of hot water should always be available at showers. Automatic temperature-regulating valves set at 90 deg F are desirable on heating systems to prevent scalding. Shower heads and valves should be inspected weekly and necessary repairs made immediately.

Solid soap, which promotes slipping accidents, is not recommended for pools. Liquid soaps in wall dispensers appear to be a satisfactory solution to this problem.

An innovation for swimmer cleanup is "soapless" soaps containing wetting agents and grease solvents. As these compounds are reported to give more effective cleanup in less time than conventional soaps, managers may find it advantageous to investigate their use. Soapless soaps do not, however, eliminate need for warm showers and swimmer inspection.

• **Disinfect bathing suits**—If swimming suits are rented by pool managements, they should be laundered after each use. This consists of washing in hot water and soap, rinsing, drying, and ironing or other heat treatment.

FIG. 14 DRINKING fountains and cuspidors are recessed in walls (Michigan Dept. of Health).

Although some large pools have a towel-and-suit laundry, most installations employ commercial laundries.

Where swimmers bring their own suits, suits should be thoroughly disinfected before being worn in the pool. One approved method of disinfection calls for soaking the suit in a 1 to 1,000 dilution of alkyl-dimenthyl-benzyl-ammonium chloride which may be purchased under several trade names. A vat of this solution near showers facilitates suite disinfection while swimmers are cleaning up.

• **Pool personnel**—A swimming-pool staff, which will vary in number with pool size, includes a manager, bathhouse attendants, life guards, a water-plant operator.

Bathhouses are usually staffed with a cashier, counter clerks for clothes and valuables storage, for handing out clean towels and suits, and for receiving dirty towels and suits; and men and women patron-inspectors.

Clean towels and suits are not dispensed at the same counter where dirty ones are returned. To provide additional protection against disease transmission, towels and suits are not re-issued in one day.

Towels and suits are handled and stored with care after laundering. They are handed out by attendants with clean hands over clean counters.

Life guards who have met the American Red Cross or YMCA standards for such personnel and are proficient in administering artificial respiration—should be present whenever the pool is in use. Minimum requirement is one lifeguard per 75 swimmers.

Water-plant attendants should be capable of collecting water samples for bacteriological analysis, making rou-

time chemical tests, adjusting chemical feed-devices and chlorinator, operating purification plants on their own responsibility and making minor equipment repairs.

They should have a notebook with blank forms in which to record daily number of swimmers; peak swimming loads; volume of new water added; temperature of water and air; number of male, female and child patrons; actual time of pump-and-filter operation, duration of backwash for each filter; amount of each chemical added; when sides and bottom of pool are cleaned; and results of all pH, free-residual chlorine or other tests. In some states, a summary of operation results must be sent monthly to the health department.

• **Pool regulations**—To provide a legal basis for controlling conduct of patrons as well as enforcing desirable health and sanitation practices, personal regulations should be prominently displayed in dressing rooms and pool area. Regulations should be written as concisely and positively as possible. Pool regulations include:

1. Admission refused to persons with infections, contagious or venereal disease or bandaged or open wounds.
2. Food, drink or tobacco prohibited in pool area.
3. Every swimmer required to take a nude, warm-water, soap, shower before entering pool.
4. Bathers leaving pool shower before returning.
5. Women and girls to wear caps in pools.
6. All bathers must report to attendant after showering and before entering pool.
7. Personal conduct in pool must conform to all safety requirements.
8. Spectators in street clothing not allowed in pool area.
9. Unnecessary expectoration, spouting, water roughness, or rowdyism is cause for ejection from pool.
10. New regulations, verbal or written, may be put into effect at any time, at discretion of supervisory personnel.

FIG. 15 SWIMMER INSPECTION in the bathhouse is essential to maintain the best sanitary standards (Michigan Dept. of Health).

• **Off-season protection**—As most structural and equipment damage to pools occurs during the long out-of-use season, good management directs that adequate protective measures be taken before the pool is closed down. Some preventive-maintenance measures are:

1. Dewater pool and leave main drain open so that no water can accumulate. As this practice has occasionally resulted in concrete disintegration, particularly in northern climates, some authorities now recommend that pools be kept full during off-seasons. Water-level is maintained about 6-in. below the overflow trough.
2. Disconnect and drain all water from chlorinator. Coat unpainted metal parts with petrolatum to prevent rust and corrosion.
3. Drain chemical feeders, hair strainer and pump casing.
4. Drain filters through bottom opening in shells.
5. Plug or screen drains and pool inlets to keep out animals and birds.
6. Remove floodlight bulbs and reflectors. Coat reflectors with clear oil.
7. Pack suits and towels in rodent-proof containers. Provide moth-proofing, if necessary.
8. Shut off water supply and drain all pipe lines.
9. Shut off and drain toilets and urinals in bathhouse.
10. Cover outside drinking fountains to prevent staining.
11. Remove springboards and place on flat surface away from heat and moisture to prevent warping.

Where equipment rooms might be flooded during off-season, pump motors are removed and stored at elevations that afford protection.

Sources of information

Many individuals, who have been consulted in the preparation of this manuscript, contributed freely with expert advice and experience-gained guidance. Among these experts are: J. G. Sieg, sanitary engineer, Tulsa, Okla.; W. D. Becker, swimming pool consultant, and J. W. Maescher, president of Chas. W. Maescher & Co., specialists in pool construction, both of Cincinnati, Ohio; J. L. Staunton, sanitary engineer, of Seelye, Stevenson and Value, New York City; W. M. Zucker, The Permutit Co., New York City; Frank Kristal, Weinman Pump Co., Columbus, O.; J. F. Finger, pump specialist, Ingersoll-Rand Co., Phillipsburg, N. J.; A. E. Griffin, Wallace & Tiernan Co., Inc., Newark, N. J., and J. R. Bishop, E. S. Bishop Co., New York City.

Some information was drawn from the joint committee report on bathing places prepared by the Conference of State Sanitary Engineers and the Engineering Section of the American Public Health Assn. and from the publications of the Amateur Athletic Union of the U. S. and the Portland Cement Assn.

Regulatory bulletins of the State Departments of Health of Illinois, West Virginia, Washington, Oregon, California, Michigan, Idaho, Oklahoma, Ohio and New York are sources of basic data on swimming-pool design and operation practices.

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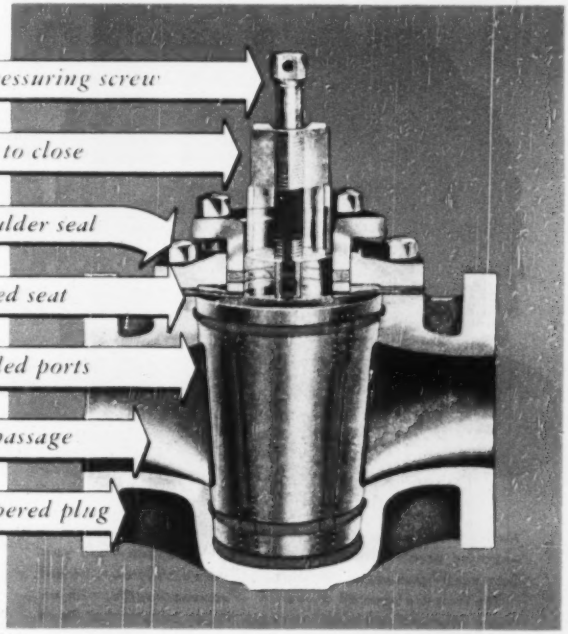

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EASY OPERATION — *quarter-turn to close*

ANTI-FRICTION — *resilient shoulder seal*

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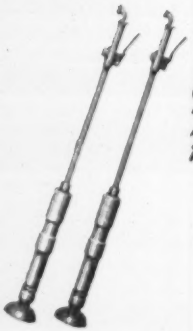

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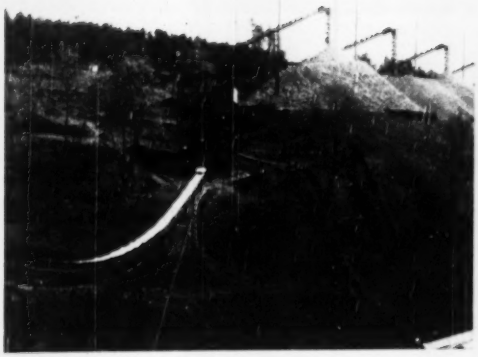
This won't happen again at Bassett, Va., after completion of . . .

Philpott Dam for Flood Control

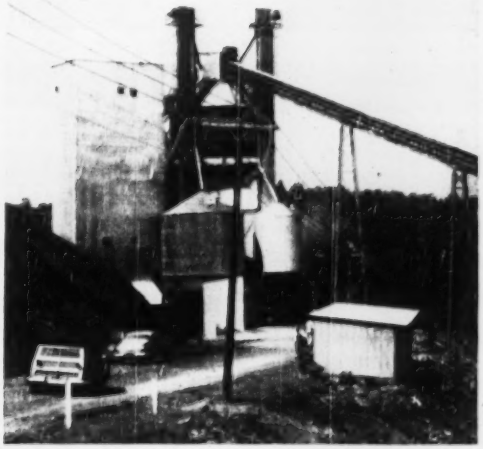
PICTURE A CHANNEL 10 ft wide and 1 ft deep with water flowing at the pace of a man's leisurely walk and you have the Smith River at its lowest. But multiply that flow by 900 to visualize the same stream as it flooded the furniture-making community of Bassett, Va., in 1937. Flow reached 37,000 cfs in town as the river level rose nearly 20 ft in four hour's time; upstream, where Philpott Dam is now being built, discharge was estimated at 32,000 cfs.

When the 219-ft high concrete structure is finished, recurrence of that destructive deluge will be unlikely; conditions similar to 1937's will mean controlled discharge of only 7,000 (instead of 37,000) cfs through the village.

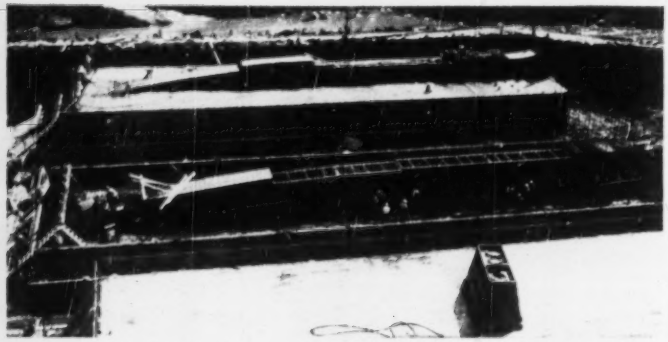
• **The broad view**—It's not just Bassett and the other small industrial towns immediately downstream that



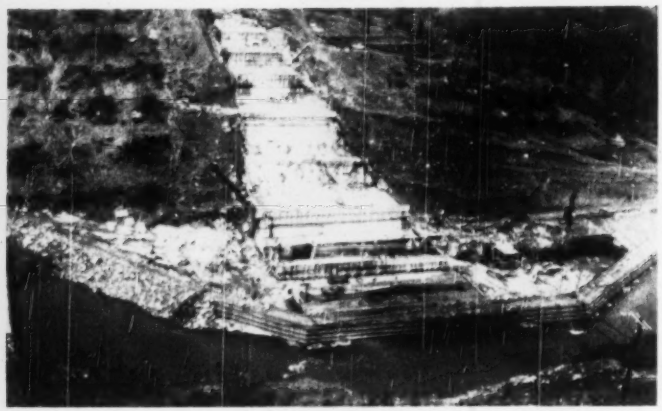
CURVED CONVEYOR flight dips across deep ravine, carrying aggregate from stockpiles to . . .



MIXING PLANT. Flake ice, cool water and cool air come from ice plant (left), so . . .



CONCRETE POURS can be kept between 40 and 62 deg. to combat heat of hydration. Here, the sluiceways are formed that will later carry the . . .



RIVER NOW DIVERTED by an earth-filled timber cofferdam. Top of dam is 219 ft above bedrock; 320,000 cu yd of concrete go into the structure.

are to be protected. The Smith is a headwater in the Roanoke River Basin, and Philpott Dam is part of a 12-dam plan approved for basin flood control. As yet, only Philpott Dam and one other have been authorized (the $78,000,000 Buggs Island Dam is about half finished downstream on the Roanoke. ENR Aug. 25, 1949, p. 26).

In leveling out the treacherous peaks of the Smith's 275 cfs average flow, Philpott Dam will build up a net head of 152 ft. for generation of power by two 6,700-kw units. A third unit (600 kw) will generate service power for the plant. Two 9-ft dia penstocks will feed the main turbines, and a 3-ft penstock will lead to the service unit.

Rainfall averages 51 in. yearly over the 212-sq mi watershed behind the dam. This area stretches back into the Blue Ridge Mountains where elevations reach 3,200 ft and streams are steep and narrow.

It is sparsely settled country with small farms in the bottomlands. Only 0.6 mi. of secondary road and an equal length of power line must be relocated out of the area that will be inundated.

• **Low water regulation**—Besides flood control and hydroelectric power production, the project will increase minimum flow from 40 cfs to a volume better suited to handling sewage and industrial wastes downstream. Other incidental benefits include the usual: recreation and fish and wild life preservation.

• **Construction progress**—Concreting is just getting off the rock of the left abutment behind the stage 1 cofferdam. Over 60,000 cu yd has been placed so far, with 320,000 cu yd to be incorporated into the completed structure.

Concrete, forms and most other materials are handled by a 20-ton cableway spanning 1,700 ft across the valley. It has been found faster to use just one 8-cu yd bucket that is never detached from the cableway carriage during concreting operations than to change an empty for a full bucket after each individual pour. The emptied bucket is set down on a platform high up on the right bank to be refilled from an 8-cu yd hopper shuttled by rail to and from the concrete plant's two mixers.

Three sluices (each 5 ft 8 in. x 10 ft) with hydraulically operated gates are to be cast in the base of the dam. These are going into the portion of the structure now being built so that they can carry the river's flow in stage 2 diversion.

• **Concrete cooling**—As with any mass concrete structure, heat of hydration is a problem at Philpott. Specifications set 40-62 deg as the allowable placing-temperature range. Flake ice, chilled water and cool air are used to lower temperature of concrete in the mixers. The refrigerated air pre-cools aggregate in the storage hoppers above the batching plant. Then the cooled water and flake ice go into the 4-cu yd batches.

Ice is made in two rotating drum machines of 15-ton (per day) capacity. It forms as a thin film on the surface of an ammonia chilled drum as the drum revolves under a row of water jets. This film is cut off the cylinder as wafer-like flakes which drop to an ice storage bin to await use in concrete manufacture.

Portland and natural cements are proportioned 70:30 by weight for minimum heat generation during curing. An air-entraining agent is added for better workability. A lean mix (2½ sacks per cu yd), typical of many current Corps of Engineer concrete dams, is being used.

• **The builders**—The Philpott project will eventually cost slightly over $13,000,000, but as yet no contracts have been let on the power installation. So far, there is only the $6,500,000 dam contract held by the Bates & Rogers-Morrison-Kiewit heavy construction combine.

S. E. Winks is project manager for the contractor. W. C. L. Jones is project engineer and F. E. Fogg, general superintendent. About 350 men are working on the project at its present stage.

For the Corps of Engineers, William D. Nowlin is resident engineer, with J. R. Page his assistant. The project is in the Norfolk District under supervision of Col. George T. Derby, district engineer. (Flood picture courtesy Shafford Studios, Bassett.)

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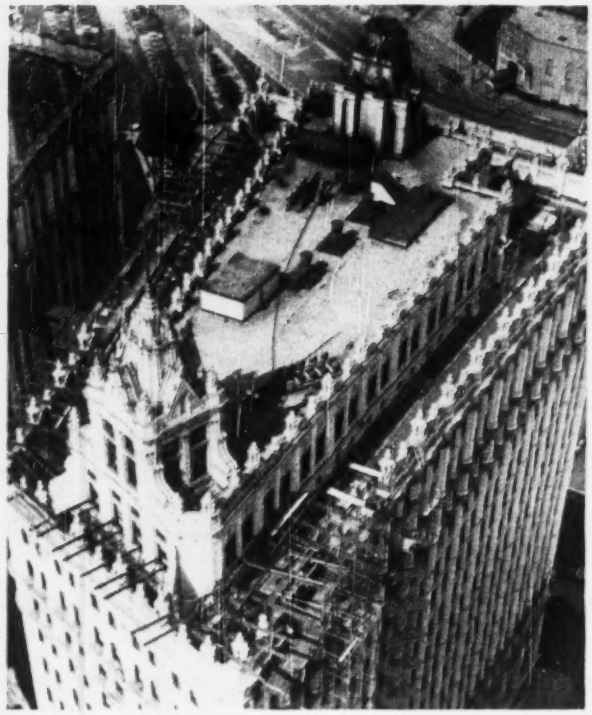
Wrigley Building Parapet Replacement



Robert L. Moore
Senior Engineer, Const. Section
National Safety Council
Chicago, Ill.

WHENEVER ANY TYPE of demolition work is being done on a building fronting a busy thoroughfare, many safety measures must be incorporated in work procedures. And when the job is on Chicago's Wrigley Building—which faces one of the world's busiest streets (Michigan Avenue)—unusual safety measures are called for.

The job is parapet wall replacement: Stripping the parapet wall down to the roof level to allow close inspection of some of the supporting structural steel, and complete replacement of the terra cotta walls to their original lines and elevation.

The Wrigley Building is known the world over for its gleaming white terra cotta finish. Anyone seeing it at night, brilliantly lit up by powerful flood-lights, will be impressed by its architectural treatment.

There are two sections of the Wrigley Building, both facing on Michigan Avenue. The south section is 26 stories in height—including the tower section that contains the familiar four-sided Wrigley clock. The north section is 16 stories high. Maintenance of these buildings is a big job in itself, especially in keeping them clean and white, properly tuckpointed and in otherwise good condition.

The work currently underway is on the north section of the building. It involves the complete removal of the finials (ornaments) and other architectural terra cotta from the parapet walls down to the roof level. The parapet wall rises 8 ft to 5 in. above the roof level, with the main finials extending 7 ft 9 in. above the top of the wall.

• **Many safety measures**—Removal of the parapet walls around the 640 ft perimeter of the building is a demolition job calling for precautionary measures, for the protection of the public as well as the workmen engaged on the job.

For instance, one of the first steps taken was the erection of a sidewalk shed on the east side of the building along Michigan Ave. Next came the building of a plywood fence enclosure at the lower level of Michigan Ave. to serve as a materials yard and storage area. In one section of this materials yard a space was set aside for a landing and loading dock at a convenient height for loading dump trucks with the broken terra cotta, brick and mortar.

A two-platform materials hoist was erected at the north side of the building, with the lower landing at the loading dock level. A tubular type metal tower was erected and tied into the building at every fourth floor, for stability. Erection planks with end cleats were used by the men erecting the tower. Wooden gates were installed at upper and lower landing levels and interlocks were provided with red and green lights at the hoist operator's level.

Heavy-duty swinging scaffolds were installed, with the supporting I-beams being carried on a built-up tubular scaffolding, anchored into the roof-supporting steel. The platform level on the scaffold is 8 ft wide, with 2x10-in. planks serving as scaffold lumber. Handrails are 2x4's, with hardware cloth hung between the handrail and the scaffold platform. Additional safety precautions include tarpaulins that hang from the supporting I-beam members to the scaffold platform, and plywood cut to fit the contour of the building, to assure a tight fit that will prevent material from falling through.

• **Electric hammers are grounded**—The parapet walls are being demolished with 2-in. jack hammers and ¾-in. chipping hammers; all electrically-op-

erated, equipped with three wires, and grounded. A 3,000-lb truck derrick and a small electric hoist are removing the finials.

The roof of the building is protected with 2x10-in. planks, strapped together to protect the roof and to prevent the possibility of its blowing off in a high wind. As the debris is removed from the existing walls it is immediately shoveled into empty 55 gallon drums; no accumulation of rubbish or debris being allowed on the roof. The filled drums are immediately wheeled away on rubber-tired, two-wheeled hand trucks on the roof runboards, which lead in a continuous line to the material hoist tower. A telephone at roof level (to hoist operator) assures proper control of rubbish and debris as it is moved from roof to ground level.

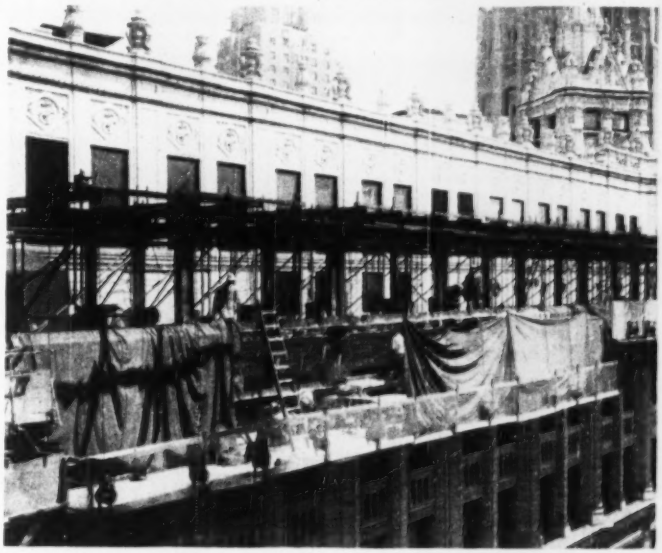
In addition to the terra cotta facing and backing that is being removed, along with the brick in the parapet wall, there are some horizontal steel members that are to be replaced along with two shelf angles in each bay. Other steel is to be thoroughly cleaned, wire brushed and given a coat of rust-resisting paint before any of the parapet wall is replaced.

Stainless metal hangers are to be used in the replacement of the terra cotta, while the new terra cotta will have the same color and general appearance that has existed for years on this familiar landmark. Some minor changes have been made in the terra cotta that will be replaced, to eliminate the possibility of the water being trapped in depressions and to assure a continuous drip on all projecting members. Replacement of the terra cotta is to follow closely behind the removal process.

• **Hard hats and goggles**—The workmen on the hammers as well as the muckers wear goggles equipped with side shields. All workmen at ground level wear hard hats. Canvas covers are put over the 55-gallon drums before they are taken down on the material hoist to eliminate the possibility of flying dust or of any material falling from above. And the drums are hauled away immediately after they are lowered to the loading dock. The loading dock and platform is periodically sprinkled with water to settle dust and lessen fire hazard.

The work is being done by Ragnar Benson, Inc., Chicago, Ill., under the supervision of Frank Wood, project manager, and Carl Tankred, superintendent. Initial operations for the demolition work were started last May 29. The parapet replacement work is scheduled for completion by Dec. 30 this year.

JOB-DEVELOPED tool for grinding out mortar joints in terra cotta was made by mounting an 8-in. abrasive wheel, ⅝-in. thick, on a heavy-duty disk sander. Rubber feet on strap-metal legs prevent slippage and damage to the adjoining terra cotta.



STURDY SWINGING SCAFFOLDING, high above street level, is supported from overhanging beams securely anchored to roof steel. Tarpaulins cover the exposed walls, while hardware cloth stretched between handrail and scaffold platform prevents debris or small tools from falling on pedestrians below.

UNDERPASS (arrow) eliminates grade crossing (street on right) at one end of freight yard where traffic delays made driving hazardous.

FOUR-LANE DIVIDED HIGHWAY now passes under 17 tracks. Rails are supported by 33-in., wide-flange beams, on 2-ft 6-in. centers.

Underpass Supports 17 Tracks

G. A. Greene

Associate Highway Engineer
California Division of Highways

CONSTRUCTION of what might be the biggest grade separation job in the Far West was completed this spring in Roseville, Calif. The $1,500,000 project involved construction of a depressed four-lane, divided roadway through the center of the town's business district with structures over it supporting two streets and 17 Southern Pacific tracks.

Roseville is a major freight center lying just east of Sacramento and at the foot of the Sierra Nevada, it is the gathering point for rail freight shipments moving east from California. More refrigerated cars for produce shipping are handled there than at any other similar center in the state.

Roseville is also a major highway junction—the intersection of U.S. 40 (an important east-west route) and U.S. 99E (a north-south route). U.S. 99E crossed one edge of the freight yards.

Motorists had come to expect a delay in Roseville due to switching of box cars. Particularly on late summer nights when both vacation traffic and produce shipping are at their peak. Vacationists in 1950 will have no delays in Roseville.

Although the improvement was needed for many years, it was not feasible until passage by the legislature of the Collier-Burns Highway Act in 1947. This bill increased highway revenues and provided for the development of a long-range highway construction program.

The Roseville work was blueprinted during the war and construction started Oct. 27, 1948.

• **Two 2-lane roadways**—The underpass involves two 24-ft wide, two-lane roadways. A 7-ft wide sidewalk is provided on the west side. The center dividing strip includes a steel bent that divides the supporting beams into two spans—39 ft on the west side and 31 ft on the east.

With an E-72 loading, and spacing the beams at 2-ft 6-in. centers, this results in 33WF200-beams for the 39-ft span and 33WF152 for the 31-ft span.

The length of the structure along the highway centerline is 360 ft and, because of its tunnel-like aspect, continuous lighting is required for both pedestrian and vehicular traffic.

Drainage from the underpass and connecting roadways is collected in a pump house and handled by automatic sump pump to storm sewers.

• **Uninterrupted service**—The major construction problem was avoidance of service interruption on any of the 17 active railroad tracks. This required construction to be carried on in three separate sections.

The railroad tracks were first moved enough to provide working room for about one-third of the structure. When this portion was completed, the tracks were moved back to their original position. But they were now supported by the new substructure.

After three such shifts, all the railroad tracks were finally replaced approximately in their original locations. All the work of moving and reconstructing railroad tracks and appurtenances was done under the supervision of the Southern Pacific Railroad Co. by its own forces.

In addition to the underpass structure, the project included two overcrossings to carry streets over the depressed section of the highway. Both of these structures are of reinforced concrete slab construction with center bents in the underpass dividing strip.

Concrete pavement is used for the underpass section, with plant-mixed surfacing on approach roadways. All concrete pavement consists of 8-in. uniform thickness slabs placed on 4 in. of cement-treated base. The base is on a course of selected material.

New roadways with plant-mixed surfacing are composed of 3 in. of plant-mixed material on 6 in. of crusher run base and 15 in. of imported borrow.

The project was designed and constructed by the Bridge Department, California Division of Highways, under the direction of F. W. Panhorst, bridge engineer. The Guy F. Atkinson Co., South San Francisco, was the contractor. The author was resident engineer for the department.

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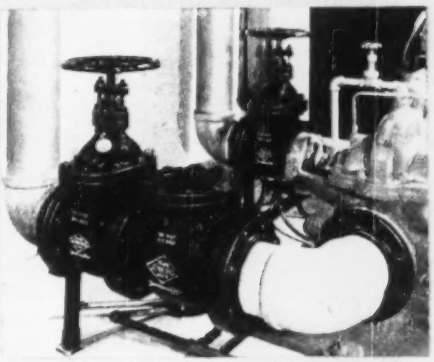

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READER COMMENT

Tidelands Decision Bad

Sir: In the editorial "New Horizons" (ENR June 15, 1950, p 21) the thought was expressed that the submerged oil lands decisions by the United States Supreme Court in the Texas and Louisiana cases removed the cause for indecision that has held back offshore drilling and the construction of necessary drilling platforms in deep water. It also expressed the thought that oil exploration work could now go ahead with certainty as a result of the decisions.

An examination of the question reveals the opposite effect. The Texas and Louisiana decisions were based upon the decision of the Supreme Court handed down June 23, 1947, in the case of the United States vs California, No. 12, Original, October Term 1946, and merely extended to two more of our states the same confusion, indecision and tieup of oil exploration that has been experienced in California as a result of the California decision. A careful reading of the decisions demonstrates that the court decided nothing definitely, and leaves everything for determination by Congress and by Special Masters.

After 150 years of established and confirmed property rights in the states and their grantees, the tideland issue originated in the Nineteen Thirties with oil and gas lease filings made by speculators under the 1920 Federal Mineral Leasing Act. These applications were made on tidelands and submerged land throughout the coastal states. These oil and gas lease speculators and many other speculators, with larceny in their hearts, who made filings on proven and producing state and municipal tideland oil leases through the medium of "Public Land" scrip issued by Congress about a century ago, are seeking and in some cases, obtaining large unearned riches. Many federal government representatives have been the instruments of, and the American public has been the target of, a propaganda machine financed by the speculative sale of shares in enterprises which can never pay a cent other than speculative profits.

These enterprises are pure speculations unless a formula can be found to transfer the proprietary rights of the states and their grantees and lessees to the speculators. The speculators and federal agencies are still groping for this formula, and after 15 years are becoming desperate in their efforts. Another factor which influences both speculators and oil companies to hope and work for such a formula is that the states and their subdivisions have been netting from 3 to 8 times more per barrel of oil produced than the best record of the federal government.

In California after 3 full years of complete tieup of new offshore oil exploration resulting from the Supreme Court decision of June 23, 1947, the processes of law have as yet not even determined the proper means of procedure for holding hearings for the purposes of taking evidence to ascertain the basic facts as they may relate to determining a boundary line between inland waters and marginal sea. Many years are apparently needed. The hands of all local agencies are completely tied in the meantime and the federal government has no authority in law. Texas, Louisiana and other states will undoubtedly experience the same results as has California.

The court, in its decision, (the confusion of which is best expressed by the two dissenting opinions in the California case) has placed in jeopardy property rights worth billions, including every port and harbor, and has set down new principles which, in the opinion of most of the states attorney generals, endanger private rights in every piece of property in the United States. The court expresses the belief that determination of the boundary between inland waters and marginal sea, neither of which has ever been defined in law or any other manner, is a simple procedure, which any engineer knows is not the case. Fortunately the court also expresses the belief that Congress in its wisdom "will not so exercise its powers as to brings about injustices to the states and their subdivisions."

The one and only positive and final solution to this problem, which will assure property rights and real progress in offshore oil and other shoreline developments, will be legislation such as that which was recently reported out of committee in the House of Representatives and known as the "Walters" bill. This bill would confirm in the states and their grantees by quitclaim, that narrow strip of marginal sea and the inland waters, which have always been recognized as theirs, thus avoiding the upset of property rights, and would confirm in the federal government all of the continental shelf beyond the territorial limits of the states. Then indeed, could offshore exploration proceed. The principal obstacle to the completion of such legislation is a group of well entrenched speculators, an occasional radio commentator or columnist and the threat of a Presidential veto. Both houses of Congress have previously favored the legislation.

ROBERT R. SHOEMAKER
Chief Harbor Engineer
Board of Harbor Commissioners
Long Beach, Calif.

Public Power in Northwest

Sir: The writer of the article "Hungry Horse Design Change Helps Northwest Power Pool" (ENR June 8 p 23) is apparently either not well informed as to Biblical characters or of the activities of Dr. Paul Raver to have called him St John. The more accurate comparison might be with Jacob pretending to be Esau, to secure his father's blessing, or others who could be mentioned. (Editor's Note—The reference to St John related to Dr. Raver's extensive travels and speechmaking in the interests of public power.)

As far as the evidence goes, Dr. Raver has had no important part in any of the development of the Columbia basin except to extend transmission lines to different portions of the region and often displacing existing lines of private power companies. The first week after Dr. Raver assumed his post as Bonneville Administrator, I heard him give a public address in which he said, and properly, that it was not his function to tell people whether they should have private or public power systems, and whatever the public decided would determine his actions.

Instead of following his own words he has spent large sums of public funds, and, of course, without sanction of law, to replace private power companies with publicly owned ones. For instance, he has had Morton Tompkins, then Oregon State Grange Master, on the payroll of Bonneville, ostensibly as a consultant on agricultural matters, but actually to campaign for public power systems. Details of this can be found on pages 569 and 600 of the Hearings of Senate Committee on Public Works, and in the Congressional Record April 13, 1949, report of Robert E. Lee, chief investigator of the House Appropriations Committee. This last shows that many more Bonneville public servants devoted their time to campaigning for public power although there was no authority for them to use federal funds for such purposes.

While I have no connection with any power company, I have had opportunity to be familiar with the matters

about which I am writing. After the first reports on the development of the Columbia were made by the Army Engineer Corps, I was a member of a committee appointed by the Oregon section of ASCE to summarize and adjust the then independent reports made by the Seattle and Portland army engineer offices. The report which our committee made after long study was the document which the late Senator McNary used to induce President Roosevelt to reluctantly authorize the start of Bonneville. For several years, while Oregon had a planning commission, I was on its advisory committee on power. When the National Resources Committee made its valley studies, I was in charge of the compilation of data and wrote the general report on the Columbia basin.

Doubtless you know that when the Supreme Court upheld the TVA Law (ASHWANDER vs TVA, Feb. 17, 1936), it said that the federal government had no authority to embark upon the power business. Also U. S. Statutes, Title 18, Section 1913, forbids such activities by federal employees as Bonneville is doing for CVA. I am sure you recognize the ultimate decay which will follow government domination of industry.

F. R. SCHANCK
Consulting Engineer
Portland, Oregon

Sir: There are certain facts that, were they generally known, might dull the edge of your eulogy of Hungry Horse, public power, CVA et al in your issue of June 8.

Behold the amazing spectacle of an Assistant Secretary of the Interior devoting his entire time at public expense to forcing CVA down the throats of the citizens of the northwest! If you're a federal employee you have carte blanche to campaign for it at government expense, but if you're on the federal payroll and are opposed to it you'll keep your mouth shut or else. The word has gone out.

If some of the practices of the Bonneville Administration were followed by the private utilities their officials would soon be hauled before the courts of justice. Such practices are just a sample of what would be the regular thing under an administration by a CVA Triumvirate—for example, discrimination among customers.

No private power utility can obtain an energy contract for more than one year unless it consents to let the Bonneville Administration fix its rates for resale. And this in spite of the fact that all such utilities are strictly subject to rate regulation by the states in which they operate. The effect of this is obvious. It erects financing hurdles for such utilities and "softens them up" ultimately to be taken over by the government,—a thing that happened in the Tennessee Valley and is now happening in the Columbia Basin. The government will brook no competition by private enterprise, and if a CVA philosophy should finally prevail in the Pacific northwest, private enterprise in the power field is doomed to extinction.

The writer has no brief for the private power utilities. They have done some inexcusable and unsavory things, all to their own detriment. They must be well regulated fearlessly and without discrimination. That, however, is the obligation of the states, not of the federal government. He does, however, carry the banner for private enterprise, and during the forty odd years he has been a reader of Engineering News-Record and its predecessors it has stood staunchly for those principles. Is it possible that now it is wavering?

Unless a wholesome respect for private enterprise and initiative can be inculcated in the minds of the younger generation soon to take the wheel, these United States, this "other Eden, demi-paradise" is headed down the socialistic skid road to national impotency.

J. C. STEVENS
Stevens & Koon
Consulting Engineers
Portland, Ore.

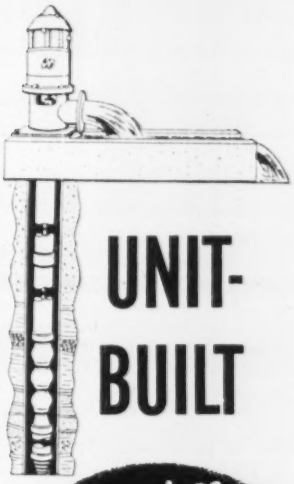
EDITOR'S NOTE: Mr. Schanck and Mr. Stevens are welcome to use the article as a springboard for criticism of public power procedures in the Northwest. However, a re-reading of the article reveals no eulogy of Hungry Horse Dam, as Mr. Stevens claims. It was a factual discussion of things as they are, and as the public power proponents would like them to be. As to the CVA idea, it was paid no compliments in the article, and has not in the past received any support in the editorial columns of ENR.

Mistakes Caught

Sir: I have found some inconsistencies in the interesting article, "San Francisco Engineer Group Proposes Dynamic Basis for Earthquake Design," (ENR Dec. 1, 1949, p 28).

You surely must have noticed by now that numbers 1 and 2 of Fig. 3, showing the position of the ordinates were misplaced upward one line. And that the computations for T, C, V and F_x at the bottom of the table in Fig. 4 are a little in error.

J. LUIS MONTIEL G.
South Bend, Ind.



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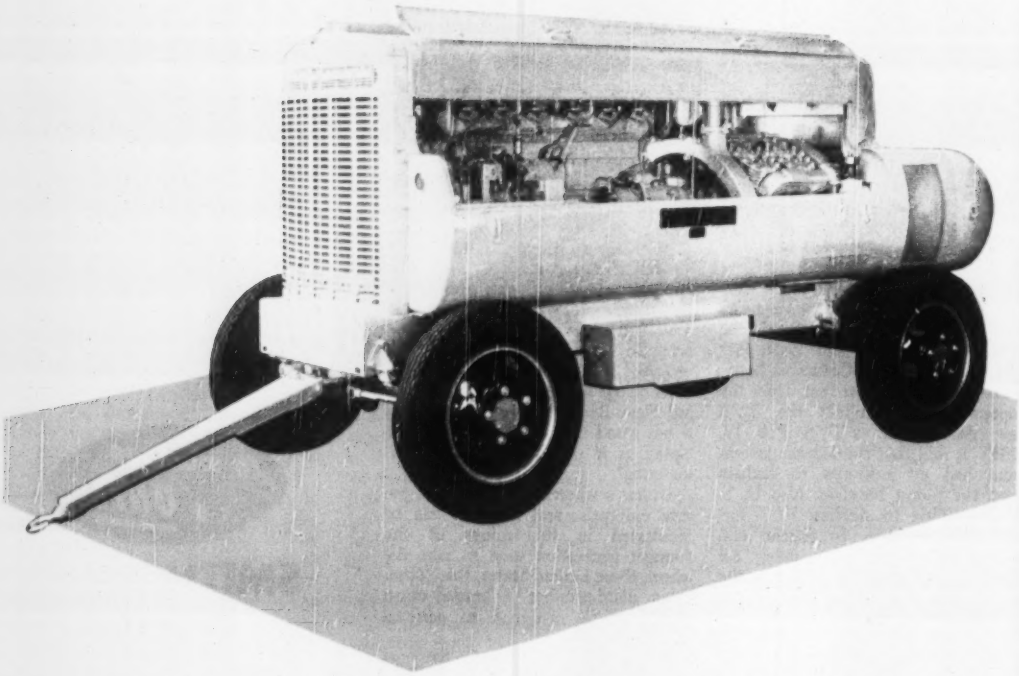

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MUNICIPAL AFFAIRS

TOLEDO is important as a port because of its location at the mouth of the Maumee River, the largest river flowing into the Great Lakes. The fine natural harbor is improved with a channel 16½ miles long with a minimum width of 400 ft, a controlling depth of 25 ft, and with 35 miles of frontage for harbor facilities.

Toledo, Ohio, is building progressively

Toledo has in all about 560 industrial plants, making a great variety of products. This diversification and the great agricultural wealth of its trade area lend stability and balance to the whole Toledo market.

Coal, iron ore, steel, chemicals, glass, gypsum, crude oil, petroleum products, sand, gravel, cement and all temperate zone agricultural products are produced or distributed in bulk in the Toledo area. It is the leading soft winter wheat market in the United States and the first port in the world in the tonnage of soft coal, which gravitates here from the coal fields of Pennsylvania, Ohio, Kentucky, West Virginia, Indiana and Illinois.

At the crossroads of east-west and north-south travel, Toledo is served by 5 air lines, 16 railroads, a terminal belt railroad, 11 bus lines, and more than 150 motor truck lines.

The $10,000,000 Lake Erie Water Supply System envisages the needs of a city of 750,000 within 20 years.

The City Plan Commission has just approved a 45-mile system of main expressways, including three new bridges over the Maumee River to cost an estimated $62,000,000.

Cities take action on traffic problems

Facing up to the fact that their communities weren't planned for today's heavy traffic, officials of many municipalities last week tried to unsnarl the tangle.

The week's developments include plans for expressways, rail-crossing separations, bridges and causeways.

And in North Carolina, the governor suggested that the state take over "all city streets."

• Expressways—Dallas and Fort Worth, Tex., want a 42-mile intercity expressway. They asked the Texas Highway Commission to select a definite location so that right-of-way purchasing can begin. Supporting the proposal, D. C. Greer, State Highway Engineer, called the expressway the "only answer" to the traffic problems of the fast-growing metropolitan area.

Meanwhile, Indianapolis, Ind., saw hope that traffic will soon move faster. By late fall an east-west superhighway will be made by improving East Washington Street.

And in Toledo, Ohio, the new road system, referred to in the article above, needs only final approval from the Ohio Highway Department and from the U. S. Public Roads Administration.

But at Cleveland, Ohio, govern-

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ment agencies wrangled over whether the proposed inner belt viaduct should be six or eight lanes. The city asked for eight. State and federal officials would like to see more evidence of the need; they urge that an engineering firm be employed to make an independent survey.

Boston's downtown snarl should be eased by the building of the long-delayed central elevated highway, said the Boston Planning Board. They expect that work will start this fall.

• **Railway Crossings**—St. Louis, Mo., saw the need to spend $16,000,000 on improvement of rail crossings in the city. According to engineers, $6,500,000 of this is "high priority."

Railways play havoc with city traffic. Nine railway lines cross the city in various directions; a maze of tracks slows traffic in the industrial section bordering the Mississippi River. There are 289 level crossings within the city limits.

City engineers have proposed separation of 19 crossings, reconstruction of 6 existing separated crossings, closing of 21 crossings, and improving protection at 133 crossings. Four of the separations have been given "high priority."

• **Bridges**—Chicago, with its 56 movable bridges, begins a survey of delay to street traffic.

Leslie J. Sorenson, city traffic engineer, states that a study is under way to reduce the time that bridges are open. Last year they were raised 55,037 times for an average of 4.24 minutes, or a total of nearly three days for each bridge. The possibility of "bunching" river craft will be investigated.

In Buffalo, N. Y., a new high-level bridge is planned to pass over the downtown waterfront area. Cost—$8,000,000.

Largo, Fla., opened a new $1,250,000 causeway that continues the main street to Belleair Beach and the shore highway. It relieves the bottleneck at the old Indian Rocks Bridge.

And in Miami, building has started on the "Broad Causeway" that will connect 123 St., North, Miami, with 96 St., Bay Harbor Island.

• **State in City?** Governor Kerr Scott of North Carolina came up with a new proposal: That the state take over maintenance of "all city streets."

Scott said that under his plan cities would continue to build curbs, gutters, sidewalks and other "extras." The state would treat city streets as part of the network of state roads.

An act of the legislature would be needed to set up state maintenance of streets.

Portal Lucky Peak Tunnel
26' Bore inside steel

Eimco 104 RockerShovel at Lucky Peak

Lucky Peak Tunnel Project near Boise, Idaho, uses an Eimco 104 RockerShovel for mucking out the 26' bore

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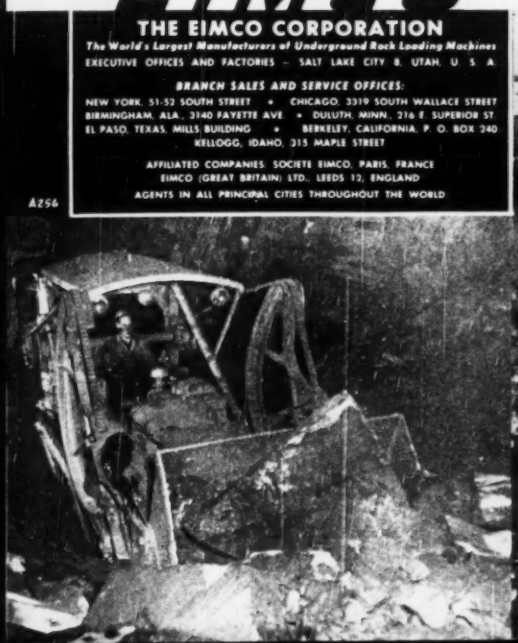
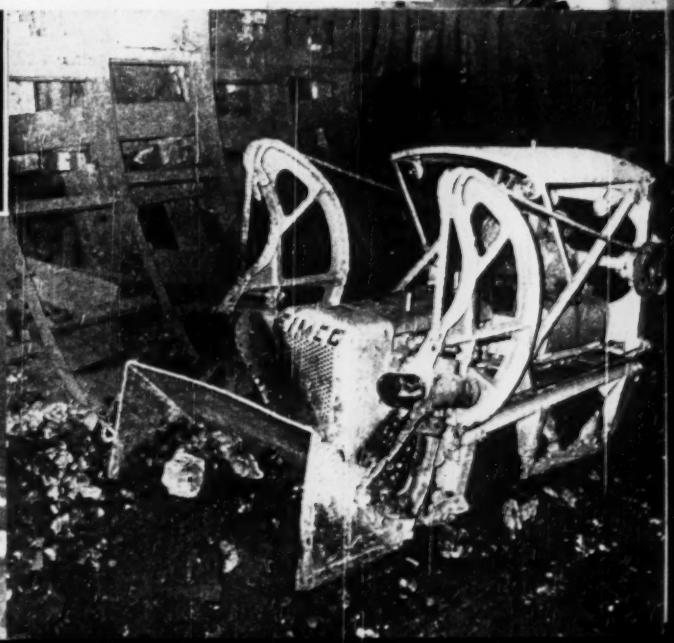
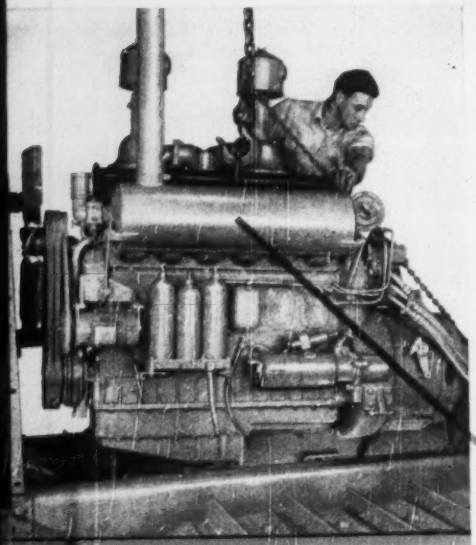
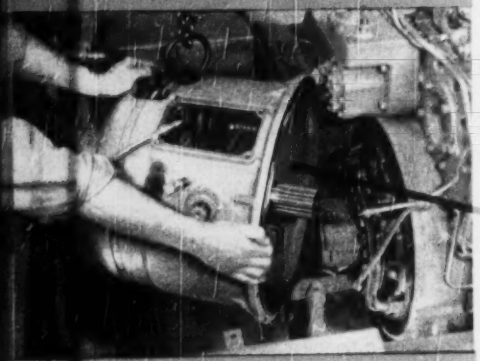


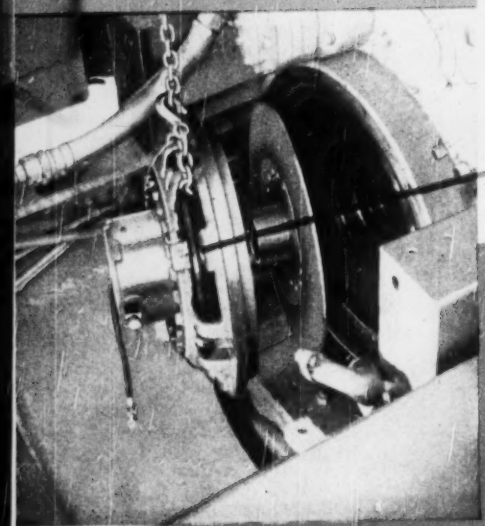




Engine can be removed without disassembling clutch.



Torque converter can be removed without disturbing engine or transmission.



Clutch assembly can be removed without disturbing either engine or transmission.

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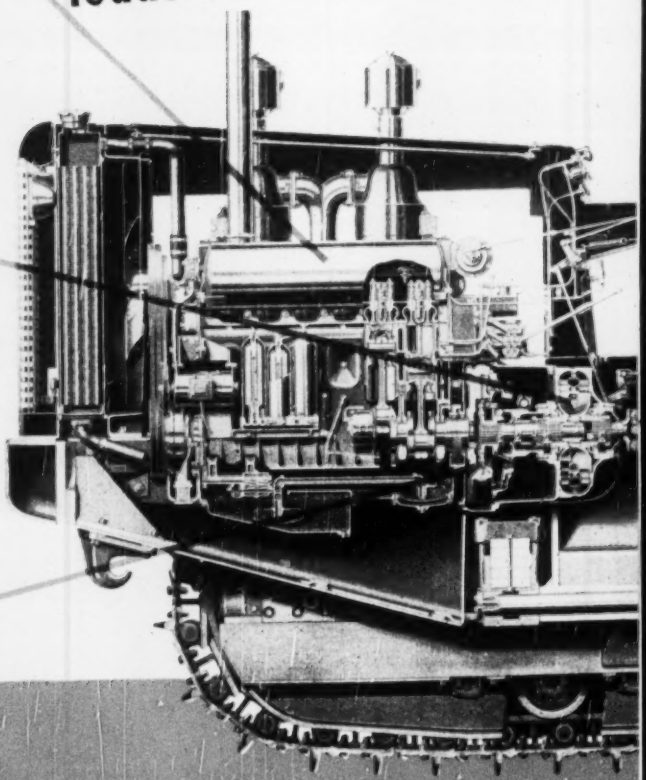

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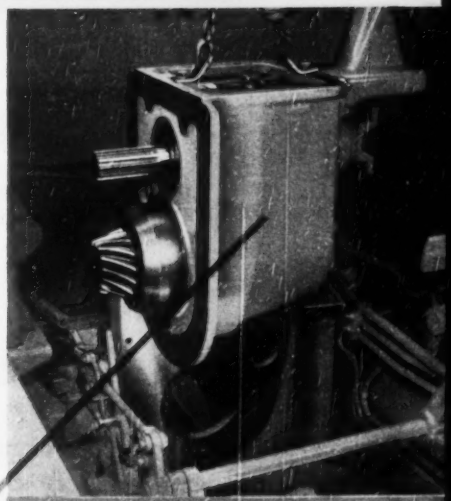
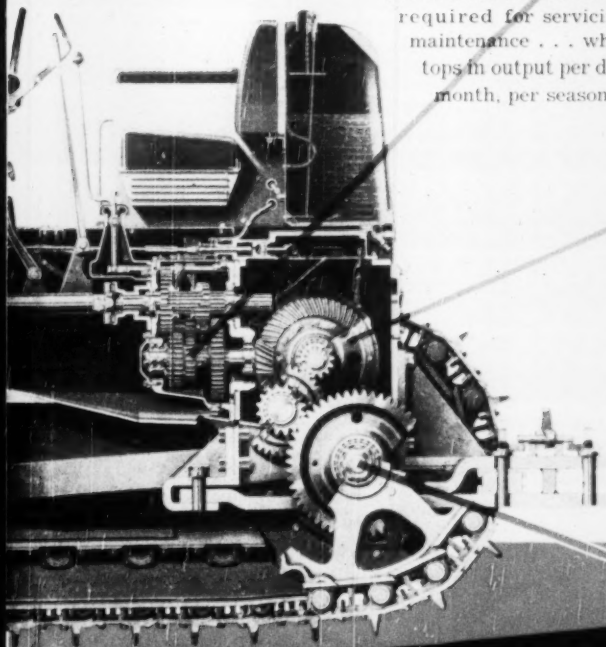
When maintenance is necessary, each assembly is readily accessible for attention. The HD-19 is designed so that each major unit may be easily removed and repaired or replaced *right on the job* without removing unrelated parts. The time and labor saved means substantial increases in the HD-19's over-all output. Remember, a tractor makes money for an owner only when it's working.

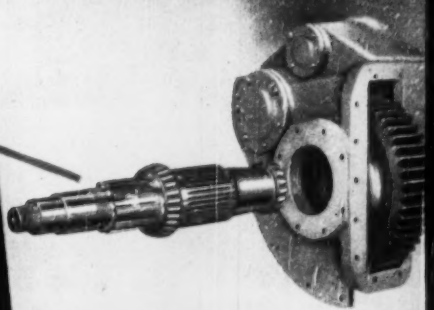
Simple unit assembly is another important reason why the HD-19 is low in total down time required for servicing and maintenance . . . why it is tops in output per day, per month, per season.



Transmission can be removed as a complete unit without removing clutch, final drive or bevel gear.

Each steering clutch can be removed independently and without disturbing final drive or bevel gear.





Final drive gear and intermediate gear can be removed without disturbing steering clutch.

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For Easier Operation . . . For Simplified Servicing

Here today – *and still here tomorrow*

that's the story of Iowa's Concrete Streets

Sioux City
13th Street, built in 1913. Photos taken 1927 and 1949

Ames
Lincoln Way, built in 1921. Photos taken 1922 and 1949

Missouri Valley
Huron Street, built in 1922. Photos taken 1922 and 1949

Council Bluffs
McGee Street, built in 1924. Photos taken 1927 and 1949

MANY Iowa motorists and taxpayers have vivid memories of the "Let's Get Iowa out of the Mud" programs of 30 or 35 years ago. Today these same motorists and taxpayers can be proud of the concrete pavements built a generation ago. Many of these fine old pavements have given continuous ***low-annual-cost*** service under weights and volumes of traffic far beyond what they were designed to carry.

The photos at left show a few of the time-proven concrete streets in Iowa. These streets are still good for many more years of service.

The outstanding durability of Iowa's concrete streets is typical of concrete pavements all over America. With concrete it's truly a case of "here today—*and still here tomorrow*."

Long service is but one of concrete's many advantages. It also:

1. Is safer. Concrete reflects the most light, thus increasing visibility at night. Night or day, wet or dry, concrete's gritty texture affords uniformly high skid resistance.
2. Reduces street lighting costs because of its high light reflectance.
3. Requires far less maintenance.
4. Has moderate first cost. For all but lighter traffic, concrete usually costs less to build than other pavements of equal load-carrying capacity. Moderate first cost + low upkeep ÷ long years of service = ***low annual cost.***

Write today for your informative, free copy of "*Concrete Pavement Design*," distributed only in U. S. and Canada.

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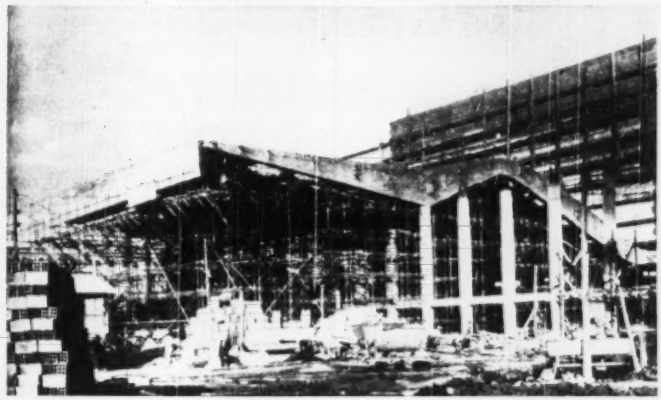
DEVELOPMENTS ABROAD



MODERN NOTE IN ANCIENT ROME—The new Terminus Railway Station in Rome will be entered under this unusual cantilever roof which projects out over the sidewalk. Mussolini planned it with Roman pillars and arches, but the passage of time—and Mussolini—brought changes. Shut down during the war, construction is now nearing completion. The main building, also of modern architecture, is 5 stories high. A wide concourse runs through the building to the train platforms set at right angles to the building. The facade is marble faced and the narrow continuous windows are of glass block. The cantilever entrance roof extends for about half the 1,000-ft length of the station. (Photo from Edilizia Moderna Magazine)

ECA's aid to French Africa is beginning to tell

ECA's economic invasion of French Africa—with a large portion for construction—really has begun to roll. New credits totalling nearly $4,000,000 bring ECA's total spending in French Africa so far to over $60,000,000.

• **Roads**—A $1,236,000 grant will go for road building projects in French West Africa, French Equatorial Africa, and the French Cameroons.

French West Africa will get the biggest slice of the road building credits—$1,035,000 for the construction of 4,300 miles of paved road. The vast colony is 10 times the size of France, half as big as the U. S. About the equivalent of $80,000,000 from all sources is slated to be invested in roads here by 1952, another equivalent $111,400,000 by 1960.

French Equatorial Africa is slated to lay down 8,500 miles of paved road, with only $117,000 of ECA money. This area is five times the size of France; a quarter the size of the U. S. Two thirds of the population live in the interior, fenced off from the coast by 630 miles of jungle. The whole area now has only a few hundred miles of modern paved highway.

The French Cameroons plan to build 200 miles of paved road with ECA putting up $84,000.

• **Cement**—ECA has given the North African cement industry $689,000 so far. Biggest share has gone to Algeria. The largest cement plant in Algeria, at Pointe Pescade, near Algiers, has quadrupled its output. Production at the plant is now more than 250,000 tons a year.

Tunisia should be able to begin exporting cement this year in considerable quantity ECA believes.

• **Airfields and Ports**—U. S. equipment

AMERICAN road-building equipment furnished through ECA at work on a jungle road in The Cameroons.

4 BIG PUMP PERFORMANCE POINTS that only

POMONA GIVES YOU!

1. ***Basically designed for water lubrication.*** Shaft and bearings are in the water stream, completely lubricated by the water being pumped, thus eliminating oiling at these points.

2. ***Open Impellers*** that give you complete freedom from sand-locking . . . minimize wear . . . eliminate the need for sealing or wearing rings.

3. ***Adjustable Capacity.*** With one simple "at-the-surface" adjustment, capacity can be varied over a wide range without power-wasting "throttling." Adjustment nut can also be used to compensate for wear.

4. ***Revolvable rubber shaft bearings*** that assure long life in rough going . . . quiet, smooth operation.

Only Fairbanks-Morse Pomona Vertical Turbine Deep Well Pumps give *all* these features. Add to them space-saving compactness, efficiency that saves power and minimizes maintenance, and you'll see why Pomona is the top choice for service. Fairbanks, Morse & Co., Chicago 5, Ill.

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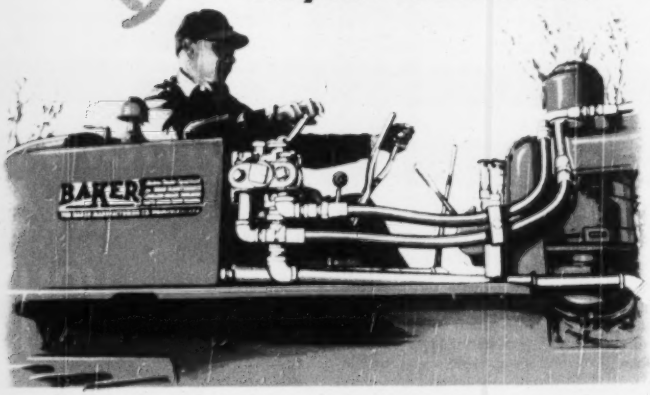
in your armchair...



Direct lift and positive down pressure are two of many features of the engine-mounted twin cylinder design in the new Baker HD-5 blades.

The open design of the mounting brackets on either side of the engine frame makes your tractor engine easily accessible for inspection and adjustment.

With a new *engine-mounted* BAKER Bulldozer or Grade-builder on your ALLIS-CHALMERS HD-5 Tractor, driver fatigue—and resulting loss in accuracy and production—is reduced to a new low.

The operator can control the blade with his forearm resting on the seat arm. The control valve is equipped with ball bearings—needs only *finger-tip* effort to shift. And due to the exclusive BAKER valve system, you can count on your blade to *hold* in any position.

For the complete story on how BAKER blades can help you do more work and better work on every shift, see your Baker-Allis-Chalmers Dealer or write direct. THE BAKER MANUFACTURING COMPANY, Springfield, Illinois.

P.S.: Baker is the PIONEER and the SPECIALIST in bulldozers

is being put to work in French West Africa, building and enlarging airfields and ports.

The two most important jobs are the building of a deep-water port at Abidjan and enlarging the Bamako airfield.

• **Mining**—$1,967,000 is slated for equipment for the rich Conakry iron mines in French Guinea. More than $350,000 has been spent on these mines prior to latest grants, for a pilot mill to experiment with refining the ore, for laboratory equipment and other equipment and supplies.

The Sahara now is being scoured for copper, manganese and other rare metals with equipment paid for by ECA. Only 10% of Algeria has been prospected although it is four times as large as France.

Foreign Briefs

Shortages in Britain too—A planned economy is no panacea for construction materials shortages, Britain is finding out. Criticisms crop out in Parliament over insufficient cement and brick to keep the housing program going at full speed. "Let's export less cement" is the most frequent plea. Uneven flow of brick to jobs is also causing difficulty. Bricklayers are paid about 60 cents an hour to lay 56 bricks with a bonus for any excess. But some production has dropped to half that rate when the workmen sense that a faster tempo would cause them to work themselves out of a job.

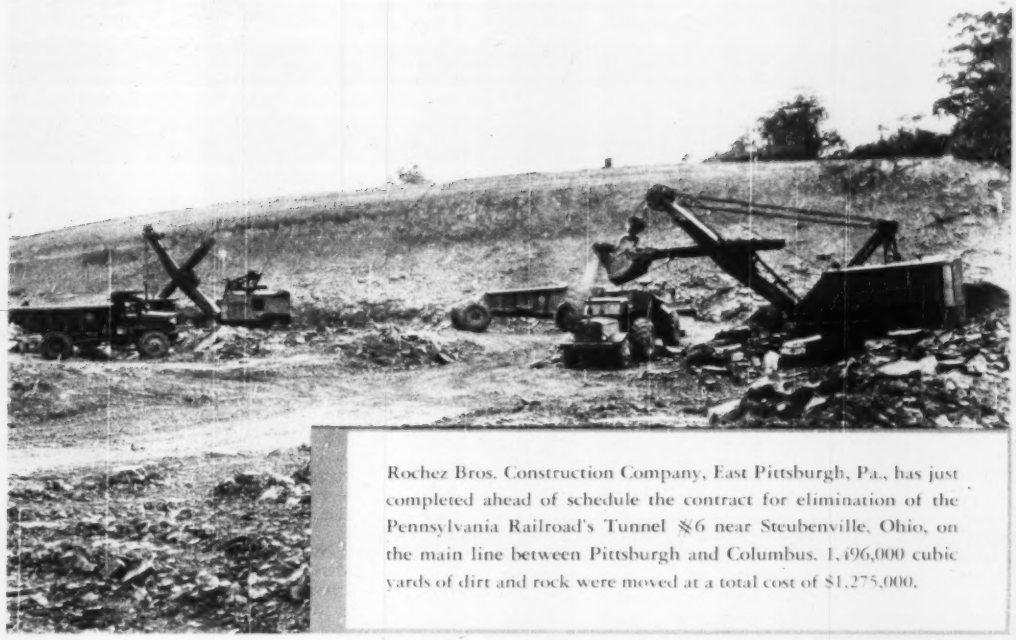
Pakistan reclamation—International understanding between the United States and the Dominion of Pakistan has been strengthened by Bureau of Reclamation resource development studies in that country, Secretary of the Interior Oscar L. Chapman says. His statement was based on reports submitted by Frederick E. Wilhelm, head of the bureau's Office of Production Planning and Control, upon his return from two months of special duty in Pakistan. Reclamation Commissioner Michael W. Straus pointed out that Mr. Wilhelm was loaned by the bureau with the approval of the State Department to the Pakistan government at the latter's request and expense, to assist in a survey to determine the part coordinated natural resource development could play in its economic advancement.

Brazil—An eight-man commission has been appointed to organize a plan for construction and financing of Rio de Janeiro's long-dreamed-of integrated suburban railway and metropolitan subway system.

GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling

on tunnel elimination project



Rochez Bros. Construction Company, East Pittsburgh, Pa., has just completed ahead of schedule the contract for elimination of the Pennsylvania Railroad's Tunnel #6 near Steubenville, Ohio, on the main line between Pittsburgh and Columbus. 1,496,000 cubic yards of dirt and rock were moved at a total cost of $1,275,000.

Another big construction project where equipment made an outstanding record of dependable performance with the help of Gulf quality products and services.

Here are a few of the reasons why so many leading contractors prefer the products identified by the familiar orange disc: Gulf lubricants provide extra protection. Gulf fuels insure full power. Gulf supplies expert engineering counsel and prompt delivery service. Result: fewer delays, lower maintenance costs, bigger profits!

Let us discuss with you how our products and services can help you on your next job. They are available to you through more than 1200 warehouses. Write, wire, or phone today.

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MEN AND JOBS

G. Nelson Perry, formerly chief structural engineer with Thos. Worcester, Inc., Boston, Mass., has established the structural engineering office of G. Nelson Perry & Co., 36 Bromfield St., Boston. Mr. Perry is president of the company. He was graduated in 1929 in civil engineering from Northeastern University. He joined the then J. R. Worcester & Co. consulting organization as a draftsman and was its senior designer when the firm broke up in 1946. He then became associated with the Thos. Worcester staff. **Thomas Murphy** is vice-president, **Lionel Crepeau** treasurer and **Walter Kisil** clerk of the Perry & Co.

E. P. Ball, county engineer and road commissioner for Napa County, Calif., since 1917, will retire in December of this year. Peter O'Neill, Ball's assistant since 1945, will succeed him.

Charles P. Hoover, Columbus, Ohio, has been employed as water purification engineer for the erection of a purification plant as an addition to the London, Ohio, waterworks.

A. J. Bulahonis has resigned as civil-sanitary engineer, Bureau of Yards & Docks, U. S. Navy, to become junior sewer designer with the advance sewer design section, Department of Public Works, Chicago. Formerly, for two years, he had served the water purification division of Chicago as junior sanitary engineer.

Thomas W. Willis, assistant city manager of Raleigh, N. C., since September, 1948, has resigned to become city manager of Newton, N. C.

Lewis J. Workman, member of Region 5's Bureau of Reclamation engineering staff at Amarillo, Tex., is going to Juneau, Alaska, where he will join the staff on Alaskan water resource development investigations. Formerly a member of the Reclamation Commissioner's staff in Washington, D. C., Workman has been with the bureau since 1930. In '44 and '45, he was on leave serving as consultant for an engineering firm in South America.

George L. Youmans, vice-president and former director of Morrison-Knudsen Co., Inc., has retired after 24 years in the firm's construction department. He joined M-K in 1926 as superintendent of railroad work on the Union Pacific's Kamela-Pendleton division. For seven years he was district manager at M-K's Spokane office. Later he directed construction of the Calumet-Sag canal in Illinois, sections of the New York Barge Canal near Utica, and Keystone (Kingsley) Dam in Nebraska. In recent years he was on the operating committee of contractors, Pacific Naval Air Bases, at Honolulu, where he was largely responsible for the $350,000,000 construction program by eight combined construction firms operating in Hawaii, on Wake, Midway and Johnston islands, and in the Philippines. He has headed the New York office of M-K since 1945. He plans to retire to his home in Greenwich, Conn.

Joseph A. Gates, who has been resident engineer for the Veterans Administration in construction of a $4,000,000 hospital at Miles City, Mont., has resigned to become construction examiner for eastern Montana for the Farm Home Administration. He will have headquarters in Billings. He will be succeeded at Miles City by **Wells R. Dickinson,** who has been project structural engineer.

Lloyd T. Keefe, who went to the Toledo-Lucas County, Ohio plan commission two and a half years ago as chief of the planning division, has been named planning director in charge of the entire staff and program, succeeding **Ellick Maslan,** resigned. **J. Thomas Via** was named permanent secretary. **Arthur R. Cline** was re-elected commission chairman.

Angus Leith, Charlevoix, Mich., has been employed as engineer at Tecumseh, Mich., replacing **Kenneth Dawson,** who resigned to become engineer in Sturgis, Mich.

Col. Keith R. Barney has been appointed chief of the repairs and utilities division, Military Construction, in the office of the Army Chief of Engineers, Washington, D. C. succeeding Lt. Col. Alfred N. Davidson, Jr., who has been assigned as a student at the recently reestablished Army War College for the 1950-51 term at Fort Leavenworth, Kan.

Edgar Bennett of Charlotte, N. C., chief engineer of eastern lines of the Southern Railway, has been promoted to assistant chief engineer, with offices in Washington, D. C., and has been succeeded at Charlotte by J. Floyd Beaver, who has been superintendent at Alexandria, Va. Bennett had been at Charlotte since 1947. A graduate of the University of Kentucky, 1900, he had been with Southern since that time. Beaver is a graduate of North Carolina State College, and has been with Southern since 1926.

The superintendent and the inspector talk about wellpoints on the Jones Beach, N. Y., Marine Stadium job. Eugene Gibbons, left, is superintendent for Lennart Construction Co.; Barry Mayer is inspector with Skidmore, Owings and Merrill, engineers for the Long Island State Park Commission.

William E. Hatch, civil engineer, formerly assistant city engineer of North Adams, Mass., and visiting professor of civil engineering at the University of Illinois, is now an assistant resident engineer on construction of the western section of the multimillion dollar mid-Cape Cod highway in Massachusetts. During the war Mr. Hatch was instructor in mathematics and engineering drawing, with rank of lieutenant, at the Massachusetts Maritime Academy.

Norman T. Buddine of Boston, Mass., who has been connected with Stone and Webster Engineering Corporation there for several years, has been named chief engineer of the R. J. Reynolds Tobacco Co. at Winston-Salem, N. C., his duties covering engineering, construction and allied activities. He succeeds **R. P. Reece,** who is retiring after 35 years.

M. G. Johnson, Indianapolis, Ind., city engineer, has resigned to join a private engineering firm.

(*Continued on page 72*)

Formerly city engineer, R. T. Cunningham, has recently taken over direction of municipal affairs in Gainesville, Fla. He's now city manager.

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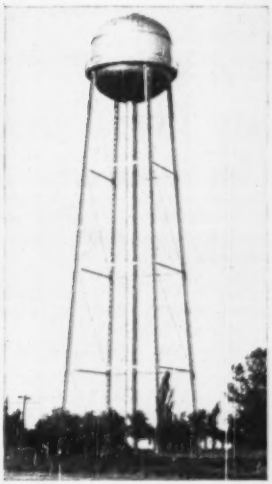
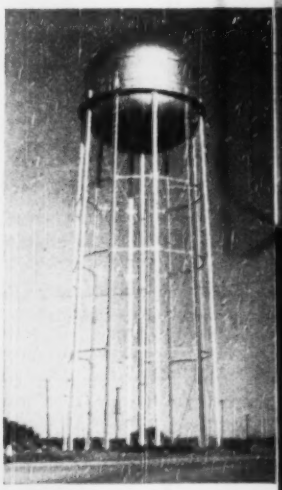
Over a wide range of capacities up to a million gallons, the Pittsburgh-Des Moines Double-Ellipsoidal design offers low investment cost, excellent appearance and economical performance. It is one of the several P-DM Elevated Steel Tank types, meeting every water storage requirement.





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WHY do you need this instrument? Because, no other instrument gives you the precision, the easy, fast working facilities for a variety of engineering and survey work *at so low a cost.*

Telescope 9-1/4" long, dust and dirt free internal focusing — coated optics — erecting eyepiece, and a magnifying power of 20 diameters. Horizontal Limb 5-5/16" Dia. with 1 Double Vernier Reading to single minutes. Vertical Circle 4" Dia. with guard. It can be used equally well on long distance or close work.

If you're in the market for a new preliminary precise transit, investigate the David White Model No. 7064-U illustrated above. Compare its many features *and its price* to all others. You'll like what you find out! See our nearest dealer or write direct. Free Bulletin No. 1050 will give you complete details on this and David White's complete line of fine engineering instruments. David White Co., 515 W. Court St., Milwaukee 12, Wisconsin.

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We offer complete, prompt repair service on all makes of instruments — levels, transits, theodolites, etc.

W. H. Clagett, Jr., after serving 14 years with the Bureau of Reclamation at Grand Coulee Dam in eastern Washington, has been transferred to the chief engineer's office of the bureau at Denver, Colo. He was engaged in installation and inspection of high voltage electrical equipment in the Grand Coulee powerhouse and later was in charge of efficiency tests for the world's largest hydroelectric generators and development tests for the world's largest high voltage circuit breakers. In the early days of Grand Coulee Dam, he was in the concrete control section and later directed research projects, devising a consistency meter for concrete-mixing plants. He has been assistant to Supervising Engineer A. F. Darland since 1948.

R. L. Van Nocker of Kansas City, Mo., has been appointed director of public works and utilities for Eau Claire, Wis. He is a civil engineer graduate of Highland Park College, Des Moines, Iowa. **Neal W. Bartholomew** has been appointed city engineer and **William E. Wolf**, present city engineer, will become superintendent of the sewage disposal plant.

R. Marrett Wheeler has been named assistant general manager and chief engineer of the Interstate Construction Co., Charlotte, N. C.

Ray E. Behrens, principal assistant civil engineer for the Milwaukee County, Wis., planning commission, has been promoted to county planning director. Mr. Behrens, who received his B.S.C.E. degree from the University of Wisconsin in 1919 has been in the county service since April 1, 1924.

David C. Costello, Jr., former assistant engineer officer at the Veterans Administration Hospital, Northport, L. I., N. Y., has been appointed assistant chief, water and sewage unit, Maintenance and operation Division for the Veterans Administration's Central office in Washington, D. C.

Fred Powell has been appointed construction engineer for the Bureau of Reclamation at Grand Coulee Dam in eastern Washington to succeed **Hugh Odor**, promoted to civil engineer in design and construction at the bureau's head office in Washington, D. C. He was employed at the dam for eight years prior to World War II, in which he served as a captain in the Corps of Engineers, has since been with the Corps at Sacramento, Calif. Odor, after studying civil engineering at the University of Illinois, started at Grand Coulee Dam as a rodman in 1936, later became inspector and materials engineer. He also was a captain in the Corps of Engineers during World War II.

How to cut costs when drafting revisions are necessary

1

* **A case history based on the experience of the Virginia Department of Highways**

TODAY the State of Virginia is engaged in a long-range Highway Zoning Program which necessitates changing thousands of drawings to include proposed right of ways.

How to do the job most economically was an important question: Retracing was ruled out—too slow, too expensive. The use of intermediate prints was considered next. They had to be long-lasting . . . easy to make . . . easy to revise.

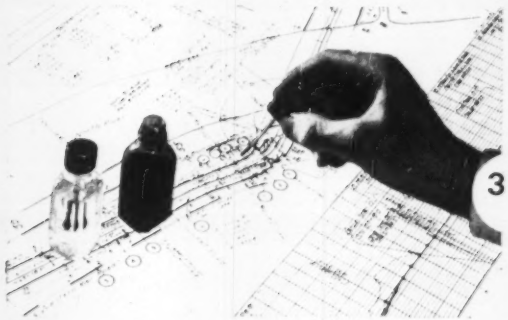
Here's why Kodagraph Autopositive Paper was chosen for the job:

Long-lasting intermediates are assured. In a "permanence test" made by the Virginia Dept. of Highways, an Autopositive print was left on a roof top for 36 days. During this time this photographic intermediate was exposed to 200 hours of sunlight . . . 6.88 inches of rain. Despite all of this abuse it was declared "good as new."

Proof, indeed, that "Autopositives" will stand up under less trying, normal conditions . . . will remain intact in the files year after year . . . ready to produce sharp, clean blueprints whenever needed.

2

Photographic intermediates are produced at a new low cost. When "Autopositive" is used, positive photographic intermediates are produced *directly* without a negative step, without darkroom handling. Maximum efficiency is realized by the Virginia Dept. of Highways because its "Autopositives" are turned out automatically . . . in a continuous blueprint machine, which can be converted readily for Autopositive production.

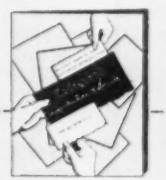


3

Drafting revisions are easily made. Unwanted details—such as existing right of ways—are removed quickly from "Autopositives" with corrector fluid. Then the proposed right of ways are drawn in with pencil or ink. Thus, new masters—prepared without costly redrafting—are ready to turn out the blueprints needed for county supervisors and resident engineers.

Kodagraph Autopositive Paper

"The Big New Plus" in engineering drawing reproduction



- It enables you, or your local blueprinter, to produce positive photographic intermediates at a new low cost.
- It enables you to protect valuable originals from wear and tear . . . obtain more legible final prints.
- It gives you photo-lasting file copies.
- It restores old, worn drawings . . . reproduces opaques.

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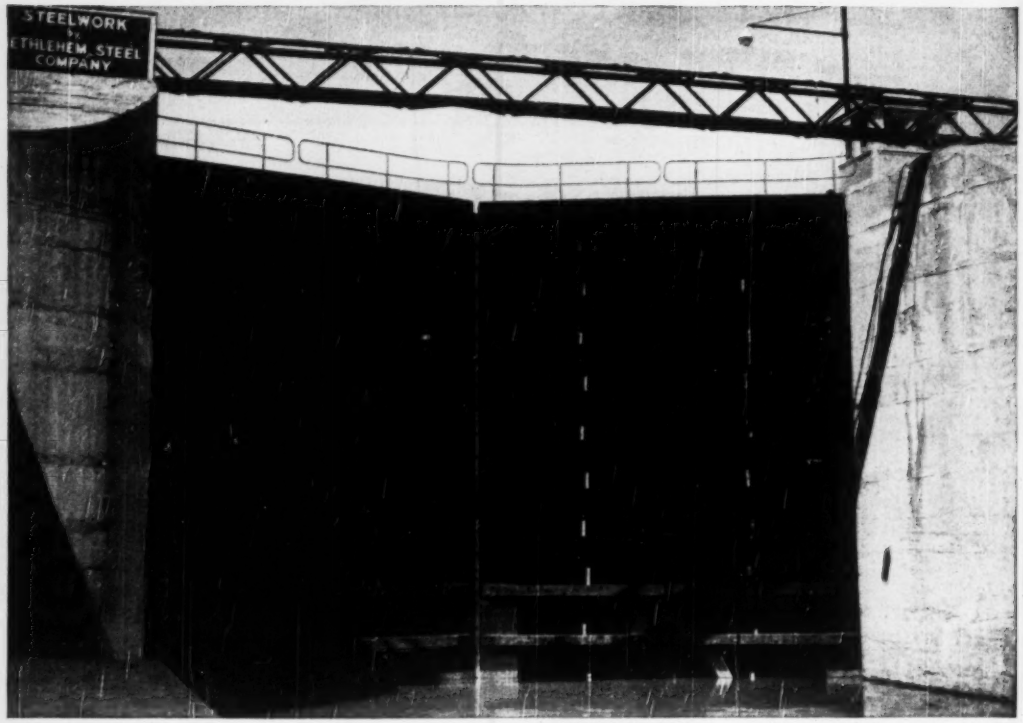

New gates at Lock No. 2 on the Erie Canal near Waterford, N. Y. These and the eight additional gates on Locks Nos. 3, 4, 5, and 6 were fabricated from Mayari R corrosion-resisting steel.

New Lock Gates on Erie Canal Built of Mayari R

Because of failure from corrosion, the lower gates on five locks in the Erie Canal were recently replaced by gates built of Mayari R steel.

When signs of serious corrosion first became apparent on the old carbon-steel gates, the maintenance engineers ran a series of tests, using various types of steel to determine which type would be most suitable for the replacement job. As a result of these tests it was decided to use Mayari R for all ten of the new gates.

Although Mayari R is generally known as a low-alloy, high-strength steel with excellent mechanical properties, it is also recognized as a corrosion-resisting material superior to other commonly-used steels. Tests show Mayari R to have from 5 to 6 times the atmospheric corrosion-resistance of plain carbon steel, and 2 to 4 times that of copper-bearing steel.

The initial cost of Mayari R is a little higher than the cost of carbon steel, but the difference is often returned many times in longer service and lower maintenance.

Ask for a copy of Mayari R Catalog 259. Besides showing many applications, including structural, it explains in detail the advantages and properties of this versatile steel.

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Mayari R *makes it lighter... stronger... longer lasting*

ELECTIONS AND ACTIVITIES

Hubert S. Kline, an industrial hygiene engineer and coordinator of the industrial waste program of the Frigidaire Division of General Motors Corp., Dayton, has been elected chairman of the 1951 conference of Ohio operators of sewage and industrial waste plants.

Col. E. V. Spence, the Texas Commissioner, has announced at Austin, the Texas advisers of the Canadian River compact. They are Robert L. Lowrey, El Paso, an engineering adviser; Assistant Attorney General Douglas Pruett, Jr.; A. H. Woolverton, engineer for the Texas Board of Water Engineers; and James S. Guleke, a member of the Texas Board of Water Engineers. The Canadian River compact commission must work out a plan to divide the waters of the Canadian River that will be satisfactory to the Federal Government, Texas, Oklahoma and New Mexico.

Archer B. Gay of Richmond, has been elected engineer-director of the Virginia Road Builders Association, to succeed the late S. J. Mahoffey.

Manpower resources of the Minnesota Society of Professional Engineers were pledged in Duluth to help the state civilian defense organization.

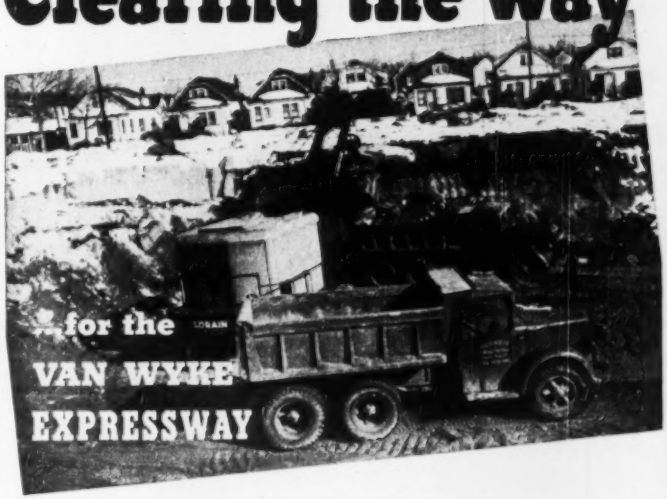
The society's board of directors discussed the best use of engineering personnel, both civilian and military, in the present emergency.

The organization, according to T. S. Thompson, Minneapolis, past president and now a national director, has been working in close cooperation with plans being formulated by Col. Ernest B. Miller, St. Paul, state civilian defense director.

Associated General Contractors, Inc., Georgia Branch, has elected C. R. Justi, Griffen Construction Co., Atlanta, as president to succeed Ray M. Lee, of Ray. M. Lee Co., Atlanta. Merrill W. Newbanks, Atlanta, was named first vice-president; Clarence W. Mobley, of Mobley Construction Co., Augusta, was named second vice president; W. P. Rose, of W. P. Rose Construction Co., Augusta, secretary; Alvin Barge of Strother-Barge Co., Atlanta, treasurer; and Hugh Robert, Atlanta, executive secretary.

(Continued on page 79)

Clearing the way



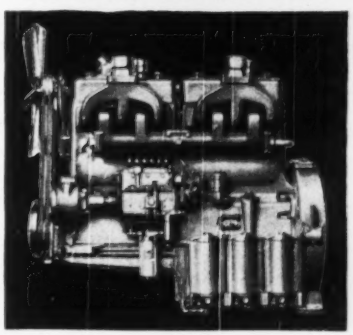
● Earth must move—before traffic can. So they're digging with Diesels—Waukesha Super-Duty Diesels! And at the rate the shovel is digging against this 16½-ft. embankment, that new New York State highway—the Van Wyke Expressway—will be completed in 1950 right on schedule.

The place is Long Island. The E. J. Varrone Construction Co., South Ozone Park, Long Island, N. Y., own the shovel. It's a 2-yd. 820 Lorain shovel—powered by the Waukesha Super-Duty Diesel Six.

It's a potent power producer—this heavy-duty, four-stroke cycle, overhead valve Diesel engine. With the exclusive patented combustion chamber used in all Waukesha Diesels you get unusual Diesel performance . . . clean burning with all standard "high speed Diesel fuels" . . . lively acceleration . . . high economy . . . easy starting . . . simpler maintenance. Send for Bulletin 1415.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK TULSA LOS ANGELES

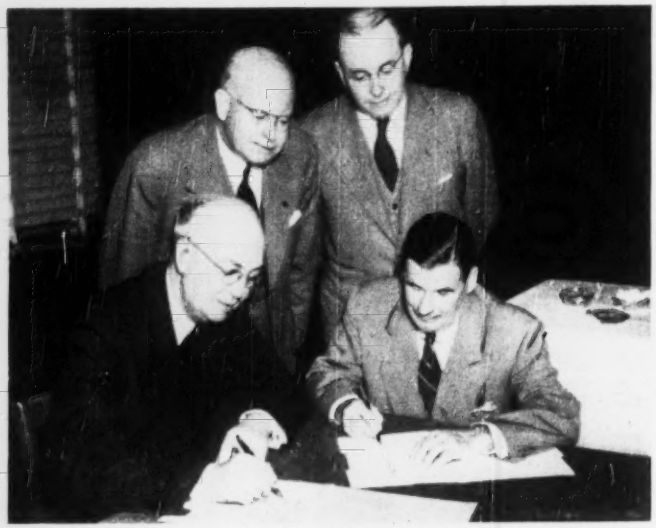
WAUKESHA



Diesel
ENGINES

WAUKESHA Super-Duty Diesel (Model 6-WAKD)—six cylinder, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displ.

EDUCATION and RESEARCH



CONTRACT FOR SCIENCE BUILDING—At the formal contract-signing for the new $1,000,000 Science Building to be built on the campus of Manhattan College, Riverdale, N. Y. City, are shown Rev. Brother Thomas F.S.C., president of the college and Daniel P. Higgins, representing Eggers and Higgins, architects. Looking on are, left, Thomas J. Ross and William J. Dwyer of the executive committee of the Building and Development Fund of the college.

Two research programs

Two research programs of interest to the construction industry will be developed at the Illinois Institute of Technology, in Chicago.

A $1,000,000 research laboratory of the Association of American Railroads has been opened there for mechanical, engineering and sanitation study.

The Structural Clay Products Research Foundation has chosen the Armour Research Foundation of the institute for development of its long-range $1,250,000 research program.

End-use research in brick, tile and other structural clay products is the assignments for this study, according to Robert B. Taylor, research director of the Clay Products Foundation, with lower in-the-wall masonry costs the main objective.

Visitor from Norway

Bjarne Basse, secretary general of the Norwegian Society of Civil Engineers, chairman of the scholarship committee of the Norway-America Association, and member of the board of the United States Educational Foundation, Norway, has arrived in Washington to begin a three-months' stay in the United States to visit leading engineering schools, engineering societies, and technical associations.

His visit has been made possible through a grant-in-aid awarded by the Department of State under the program for the exchange of persons.

Mr. Basse has been active in student exchanges between the United States and Norway since the end of the war, but has never previously visited this country. In 1945 he was appointed to the original "America Committee" as the representative of the Norwegian Institute of Technology and the committee's consultant on technical education. He became chairman of the scholarship committee of the Norway-America Association when it absorbed the American Committee. He is a graduate of the Norwegian Institute of Technology of Trondheim, where he received a degree in civil engineering.

Educational Notes

Engineering Scholarships—Nine new scholarships—all from industry—have been made available to the engineering school of the University of Kansas, starting this fall. The amounts range from $500 to $1,450 per year.

Foreign Students—The foreign student project at Massachusetts Institute of Technology has started on its third year. Laboratories are open to 73 young natural scientists, engineers and architects from 25 countries for a summer of free study. Donations from business firms and individuals are financing the project. The MIT Corporation has also waived tuition fees. Of nearly 300 graduate students from Japan and the Ryukyn Islands who are to take orientation courses this summer at United States colleges, some 25 will spend six weeks at Rensselaer Polytechnic Institute, Troy, N. Y., during August and early September. The study program is being arranged by the Institute of International Education, New York City, and is financed by the Department of the Army.

Geodetic engineering—Two graduate courses in geodetic engineering are now being offered by the civil engineering department of the University of Illinois. The first of the courses will deal with the principles and practice of precise triangulation, traverse, and levels. The second will comprise a study of the astronomic determination of latitude, longitude, and azimuth; systems of plane coordinates, map projections, and electronic and special control surveys.

Congress of Applied Mechanics—Illinois Institute of Technology will be host to the first national congress of applied mechanics to be held in Chicago June 11-16, 1951. Papers for presentation must be submitted before April 14, 1951, and should constitute original research in applied mechanics, which include kinematics, dynamics, vibrations, waves, mechanical properties of materials and failure; stress analysis elasticity; plasticity; fluid mechanics; thermodynamics. Papers should not be longer than 5,000 words. The general chairman of the congress is Prof. Lloyd H. Donnell, research professor of mechanics at Illinois Tech., Chicago, Ill.

JOANN RUESE, full-time instructor of engineering drawing at the University of Kansas, gives last-minute instructions to Edwin A. Fritz, Jr., class of 1950. Miss Ruese, who received her degree of Bachelor of Science in architectural engineering from the university last year, also is the first woman in 26 years to be elected from the engineering school to Mortar Board—national honorary society for senior women.

FRUEHAUF BULK CEMENT TRAILERS

FOR BULK HAULS

OF ANY POWDERED OR PULVERIZED MATERIAL—
90 TO 130 BARRELS PER LOAD

THIS Fruehauf Bulk Cement Trailer fits the requirements of a specialized hauling problem—yet it is not a "specially" built unit with a premium price tag. It's a standard Trailer in the Fruehauf line, with such outstanding features as Fruehauf's exclusive Gravity-Tandem Suspension or "Multi-Rate" single-axle Suspension with 2-speed Vertical Supports — features that make Fruehauf Trailers the world's best!

The discharging mechanism is powered by a 21 H.P. gas engine. It is located under the tank in an enclosed compartment mounted well forward to prevent the entrance of harmful dust. Self-lubricating twin screws convey the load to the rear—dump anything up to 1 inch in diameter at 5 barrels per minute. Screws may be operated singly or together. Triple control levers allow operation from engine compartment, or from either side of the rear of the Trailer. 2 baffles (within the tank) prevent load shifts. Manholes on the tank top, located ten feet apart, provide fast, easy loading. Curbside ladder allows easy access to manholes.

For complete information and specifications on the Fruehauf Bulk Cement Trailer, write—

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

DETROIT 32 • LOS ANGELES 58

In Canada: Weston, Ont.

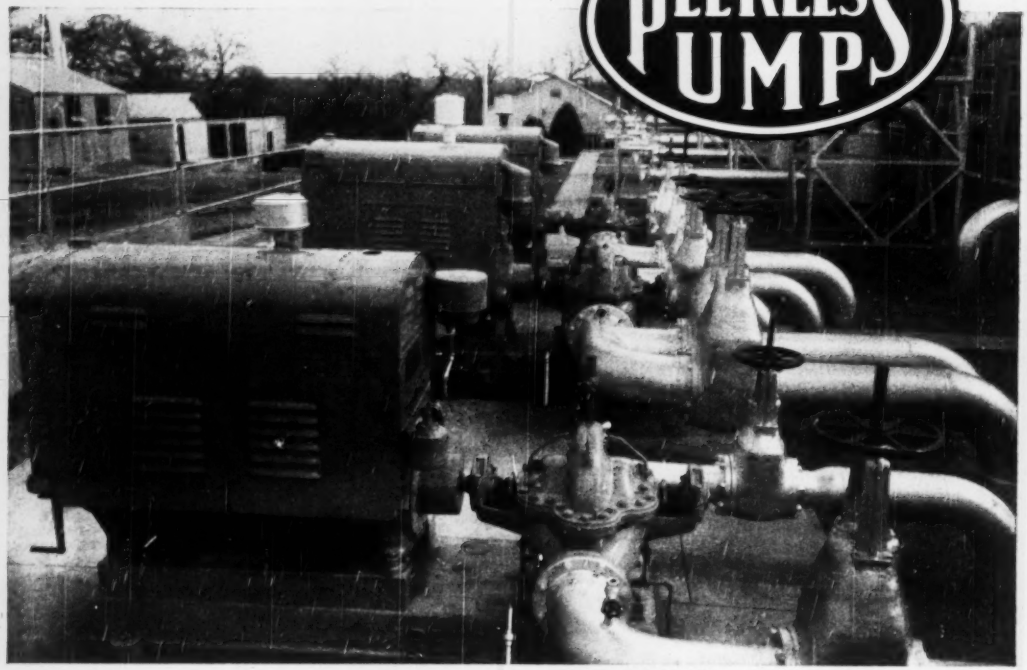
FRUEHAUF *Trailers*

"ENGINEERED TRANSPORTATION"

FIRST IN TRUCK-TRAILER TRANSPORT!

PEERLESS PUMPS PREFERRED

VERSATILE CONTINUOUS-DUTY GENERAL PURPOSE TYPE A PEERLESS PUMPS



Peerless Type A Horizontal Centrifugal Pumps Used in Gas Booster Station for Handling Jacket Cooling Water

Peerless Type A general purpose horizontal centrifugal pumps are preferred by this large producer of natural gas, for a host of reasons. Here are a few of the features that contribute to their unsurpassed performance:

1. Employ duplex angular contact thrust bearings for longer life and lower maintenance cost, under heavy continuous or intermittent duty.
2. Bearing housings have double-wall construction, first, to insure against any distortion of ball race and second, to provide water-cooling space between walls.
3. Impeller rings are generously wide and grooved; efficiency is increased by minimizing leakage between suction and discharge chambers.
4. Heavy case rings, with ribs on both ends, provide extra strength, prevent distortion and effect a seal against leakage.
5. Shaft sleeves, locked against direction of rotation by right and left hand threads at impeller hub, prevent shaft distortion when handling hot liquids.
6. Incorporate five rows of heavy duty packing and utilize an in-and-out water seal connection for use when handling hot liquids.

These general purpose pumps are completely described in Peerless Bulletin B-1500. Write for your copy.

TYPE A PUMP CHARACTERISTICS

CAPACITIES: Up to 70,000 GPM
HEADS: Up to 300 Ft.
SIZES: 1¼" to 48"
LIQUID TEMPERATURES: Up to 300° F
SINGLE STAGE—DOUBLE SUCTION
HORIZONTAL SPLIT CASE

•

APPLICATIONS:

BOOSTER STATIONS
WATER SUPPLY
COMMERCIAL BUILDINGS
INDUSTRIAL PROCESSING
WASTE DISPOSAL
COOLING AND REFRIGERATION
FIRE PROTECTION

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Factories: Los Angeles, California, and Indianapolis, Indiana.
Offices: New York, Atlanta, Chicago, St. Louis, Phoenix, Fresno, Los Angeles, Dallas, Plainview and Lubbock, Texas, Albuquerque, N. M.

The special engineering board on the problem of Red River floods in Canada has been announced (ENR June 22, p. 25). J. B. Carswell, consulting civil engineer of Vancouver, is chairman. Victor Michie, of Vancouver is the federal nominee on the Board and D. M. Stephens, engineer and Deputy Minister of Mines and Resources for Manitoba, is the provincial member. Carswell has been chairman of the similar Fraser Valley Dyking Board and Michie has been one of the three members. The board will coordinate flood protection around Winnipeg; make arrangements with municipalities to get maximum protection from floods prior to 1951; and to recommend permanent flood protection measures in Manitoba part of the Red River watershed.

CALENDAR

Pennsylvania Water Works Operators' Association, annual conference, Nittany Lion Inn, State College, Pa., Aug. 21-22.

Pennsylvania Sewage & Industrial Wastes Association, Nittany Lion Inn, State College, Pa., Aug. 23-25.

N. Y. section A.W.W.A., fall meeting, Saranac Inn, Upper Saranac Lake, N. Y., Sept. 7-8.

South Dakota Reclamation Association, convention, Pickstown, Sept. 10-11.

Conference on "Ground Facilities for Air Transportation," Massachusetts Institute of Technology, Cambridge, Mass., Sept. 12-14.

Canadian Institute on Sewage and Sanitation, annual convention, Bigwin Inn, Ontario, Sept. 11-13.

W. Va. section A.W.W.A., annual meeting, Pritchard Hotel, Huntington, W. Va., Sept. 13-14.

Conventions of Roadmasters' and Maintenance of Way Association, and the **American Railway Bridge and Building Association,** Hotel Stevens, Chicago, Ill., Sept. 18-20.

New England Water Works Association, Poland Springs, Me., Sept. 18-21.

Convention Institute of Traffic Engineers, Hotel Commodore, New York City, Sept. 24-27.

Institute of Traffic Engineers, annual meeting, Commodore Hotel, N. Y. City, Sept. 24-27.

American Institute of Park Executives annual convention, Baker Hotel, Dallas, Tex., Sept. 25-28.

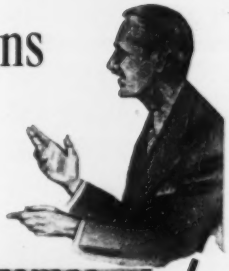
Building Research Advisory Board—Research correlation conference, National Academy of Sciences, Washington, D. C., Sept. 26.

Pennsylvania Water Works Association, Claridge Hotel, Atlantic City, N. J., Sept. 26-29.

Rocky Mountain Sewage Works Association, La Fonda Hotel, Santa Fe, N. M., Sept. 27-29.

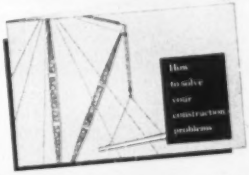
South Dakota State Association of County Commissioners, Auditors, Highway Superintendents and State Highway Officials, annual convention, Cataract Hotel in Sioux Falls, Sept. 28-30.

Your engineering plans are in competent hands



when M-C & S enters the building picture!

In working closely with consulting engineers for scores of years, Merritt-Chapman & Scott long ago learned the importance of giving full attention to every detail. M-C & S's extensive experience in the many fields of engineered construction is the best assurance that your assignment will be completed as designed, on time. All M-C & S project managers are performance-proved; facilities are unrivaled. And, as illustrated by the new brochure offered below, no project is "out-of-our-line."



New booklet presents a factual record of M-C & S's ability to solve the most challenging construction problems. Your copy will be sent immediately upon request to Dept. ENR -2

MERRITT-CHAPMAN & SCOTT
CORPORATION

Founded in 1860 . . . now in our 90th year

GENERAL OFFICES
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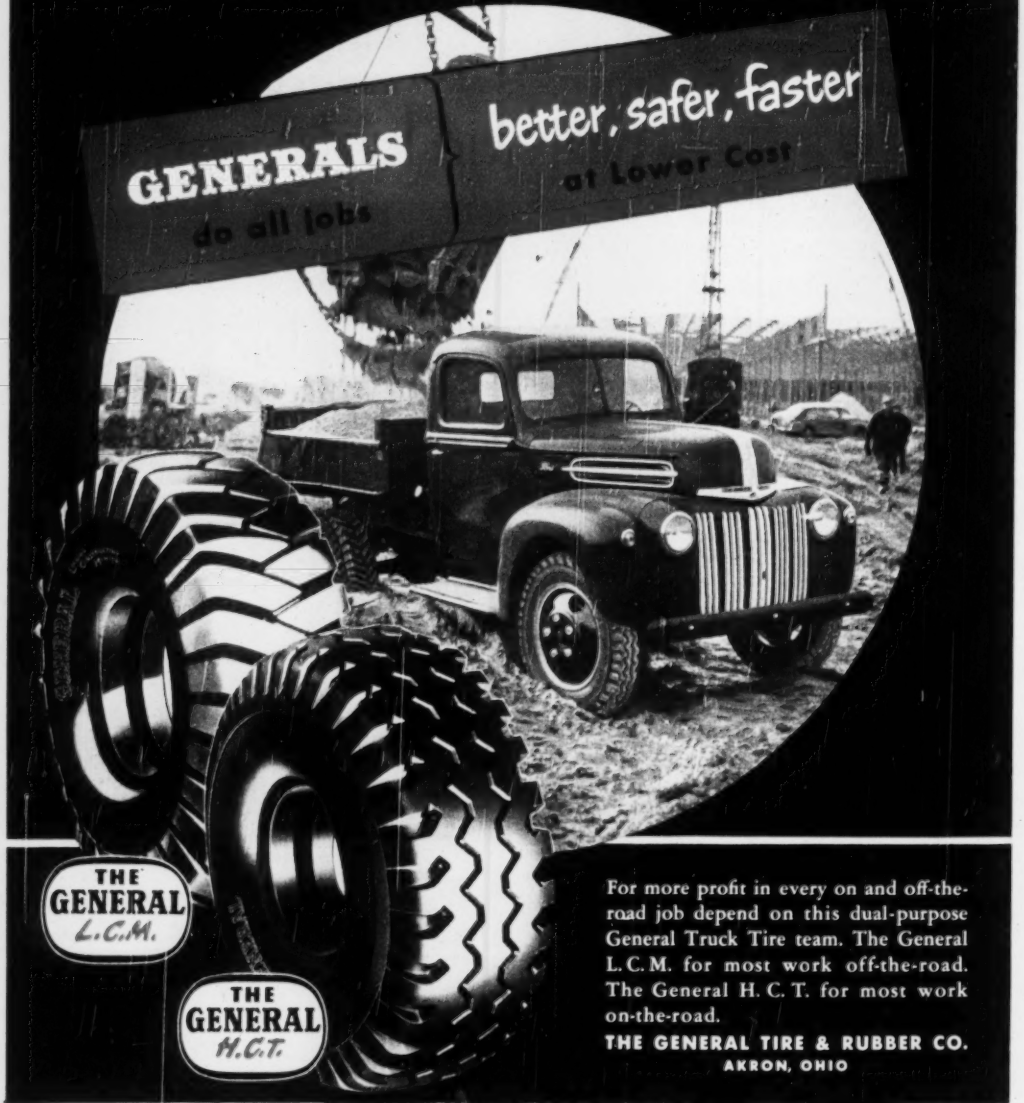
CLEVELAND • BOSTON • NEW LONDON

OVER SHARP ROCKS, MUD, GRAVEL, SAND... OUT AND OVER THE HIGHWAYS



For more profit in every on and off-the-road job depend on this dual-purpose General Truck Tire team. The General L. C. M. for most work off-the-road. The General H. C. T. for most work on-the-road.

THE GENERAL TIRE & RUBBER CO.
AKRON, OHIO

The General L. C. M.—broad tread lugs resist cutting, prevent slipping and sliding in tough off-the-road work.

The General H. C. T.—free-rolling ribs of rubber for safe traction in high speed over-the-road hauling.

General Tractor Grader Tire with maximum traction from high, long-wearing, self-cleaning tread ribs. No side slip.

OBITUARY

William J. Titus, 66, division highway planning engineer of the Bureau of Public Roads at St. Paul, Minn., died July 13. He was a 1909 graduate of Indiana University and took his civil engineering degree from the University of Wisconsin in 1913. His career was in highway design, construction and administration. For six years he was state bridge engineer in Indiana and for eight years was chief engineer.

Benjamin D. Anthony, 71, civil engineer and manager of real estate and industrial development for the Delaware & Hudson Railroad, died July 28 in Albany, N. Y. He had been with the railroad 38 years. At one time he was city engineer of Carbondale, Pa. In 1911 he was associated with the New York, Ontario & Western Railroad, but rejoined the D&H the next year, and in 1918 moved to Albany as engineer.

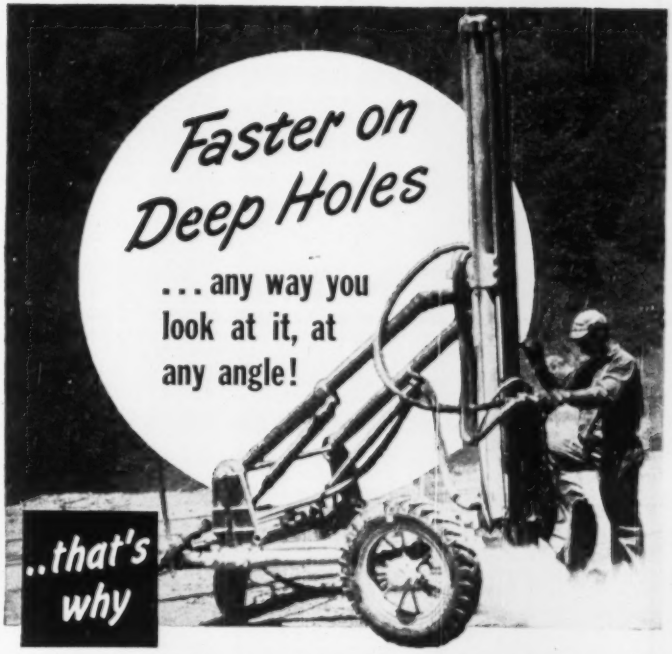
Howard O. Akers, 64, successively chief engineer, mechanical superintendent and assistant superintendent of District Buildings, died July 26 in Washington, D. C.

George A. Tilton, Jr., assistant construction engineer with the California Division of Highways, died recently in Sacramento, Calif. An authority on drainage as pertaining to highways, he was one of the authors of the handbook, "California Culvert Practice," published in 1944. With the California Division of Highways since 1918, Tilton became assistant district engineer in 1931, and in 1933 was appointed assistant construction engineer at Sacramento.

John West, 64, for many years a member of the consulting engineering firm of Macomber & West, Boston, Mass., died at Goshen, Mass., Aug. 2. He had practised engineering in Europe and in Central and South America, as well as in the United States. Much of his career was in the public utility field, and at the time of his death he was vice-president of the New England Electric System, Boston, Mass.

H. L. Caldwell, 68, president of the Caldwell Engineering Co. died at Jacksonville, Ill., July 26. His company planned and built many reservoirs and carried out drainage and paving projects.

Fred Dale Pyle, 67, for 30 years a San Diego, Calif., city engineer and



Le Roi CLEVELAND WAGON DRILLS give you lower drilling costs!

STRONG-ROTATION, and powerful hole-cleaning ability are outstanding features in the 4" bore Le Roi CLEVELAND drifter used on these universal wagon drills.

The patented air feed on the DR-30 Wagon Drill gives you an 8-foot travel for 6-foot steel changes. Moreover, this patented feed not only makes drilling faster with both steel and tungsten carbide bits, but also increases the footage drilled per bit. That's why the DR-30 puts holes down faster — with less air — than any other wagon drill available.

What's more, you can *drill at any angle* — set-up changes are made quickly and easily. Get all the facts from your Le Roi distributor.

— for dependable air power use Le Roi Compressors
Experienced distributors everywhere to give prompt service on the job!
RD-24
Airmaster
Tractair

LE ROI COMPANY
CLEVELAND DIVISION • *Manufacturers of* CLEVELAND ROCK DRILLS
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INSTANTLY BY RADIO *but hours by car!*

2-WAY RADIO

General Electric 2-way radio reduces job time, cuts your costs—plenty. It works best where work crews are dispersed and distance is a problem: in cars of superintendents and section foremen, at field offices, supply points, and on mobile equipment operating over wide areas.

Whatever you build—highways, bridges, pipe lines, dams, tunnels, sewage works—if construction involves ground distance and time, then you've got a problem in communication. Why not turn this problem over to us . . . *instant communication* is our business. There's a G-E office near you. Call there for full information. Meanwhile, write us for useful new bulletin X55-752 on 2-way radio. *General Electric Company, Section 2280-17, Electronics Park, Syracuse, New York*

You can put your confidence in—

GENERAL ELECTRIC

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PNEUMATICALLY PLACED CONCRETE
DENSE · DURABLE · HIGH STRENGTH

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Restoring Disintegrated Concrete
Dam, Dock and Bridge Repairs
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Sewer, Water Pipe and Penstock Linings
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Wood Pile Casings—Pressure Grouting
Prestressed Tanks and Silos

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Foundation Testing for Bridges, Dams and All Heavy Structures

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Manufacturers of Diamond and Shot Core Drills, Accessories and Equipment

SPRAGUE & HENWOOD, Inc.
Scranton, Pa. Dept. E, U. S. A.

for many years city hydraulic engineer, died there July 21. He held a degree in civil engineering from Utah State Agricultural College, and also did postgraduate work in hydraulic engineering there. He served 15 years with the Bureau of Reclamation, and was for a time in charge of all canal operations in Wyoming and Kennewick, Wash., and Imperial Irrigation District, El Centro, Calif.

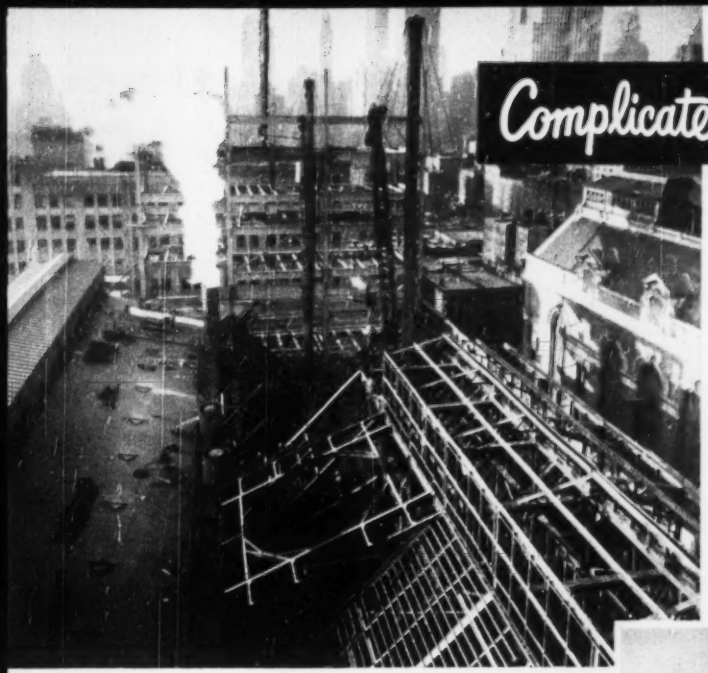
William E. Campbell, 61, Toledo, Ohio, civil engineer employed by the city for 35 years, died July 24.

Joseph C. Reynolds, 63, consulting engineer of Omaha, Neb., died recently. A graduate of Armour Institute of Technology, Chicago, 1910, he was an engineer in Omaha for 35 years. During the war he worked at Oak Ridge, Tenn., and in Canada. For several years he had been with the Union Pacific Railway at Pocatella, Idaho.

Carlton D. Passenheim, 37, engineer in the Schenectady Operations Office of the Atomic Energy Commission, died of accidental drowning recently at Schenectady, N. Y. He was an engineering graduate of Michigan College of Mining and Technology in 1934 and received his master's degree at the University of Michigan a year later. During World War II he served in the Army Engineers with the Persian Gulf Command and in the CBI Theater on the Ledo Road, emerging with the rank of captain.

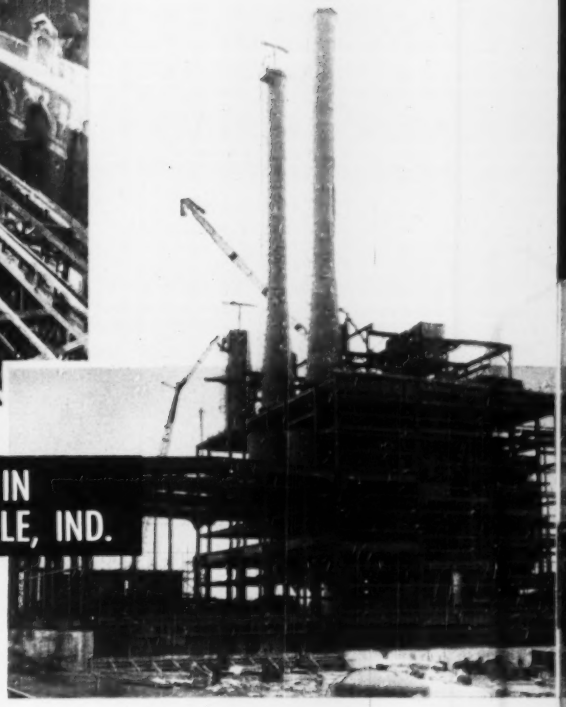
Daniel M. Ober, 62, a civil engineer with the Delaware, Lackawanna & Western Railroad for 40 years, died Aug. 1 in Buffalo, N. Y. He was graduated from Pennsylvania State College in 1910. He joined the D.L.&W. immediately and was transferred to the Buffalo office in 1917.

Col. George S. Minniss, 78, for many years chief engineer of the former Buffalo Grade Crossing & Terminal Station Commission, died Aug. 3 in Buffalo, N. Y. On the staff of the Grade Crossing Commission for 30 years, he retired in 1944. His military career of 38 years, ended with his retirement in 1935. A civil engineer, Colonel Minniss went to Buffalo in 1893 and practiced engineering until he joined the Grade Crossing Commission in 1914. He carried over when the Grade Crossing and Terminal Station Commissions were consolidated in 1923. He was promoted to first assistant engineer in 1925 and chief engineer in 1930. He retired in December, 1944.



Complicated DEEP IN THE HEART OF NEW YORK CITY

Waterside No. 1 Generating Station, for Consolidated Edison Company of New York, Inc., designed by Consolidated Edison Company.



Straight-forward OUT IN NOBLESVILLE, IND.

Noblesville Power Station, Noblesville, Indiana, Public Service Company of Indiana, Inc. Designed by Sargent & Lundy.

You can depend on American Bridge to build it right!

The pictures above give you a pretty good idea of American Bridge Company's versatility. We fabricated and erected all steelwork for both power plants.

The reconstruction of Consolidated Edison's Waterside No. 1 Generating Station in a congested area of New York City involved a number of out-of-the-ordinary working problems. It called for complete new steelwork for the boilerhouse and west electrical gallery buildings, new turbine foundations, and new bus tie between the east and west galleries. These necessitated complicated shoring and alterations, and the skillful manœuvering of heavy girders and construction equipment.

American Bridge Company has the know-how and experience, plus the men and equipment to handle either type of job speedily and economically. Just call our nearest Contracting Office.

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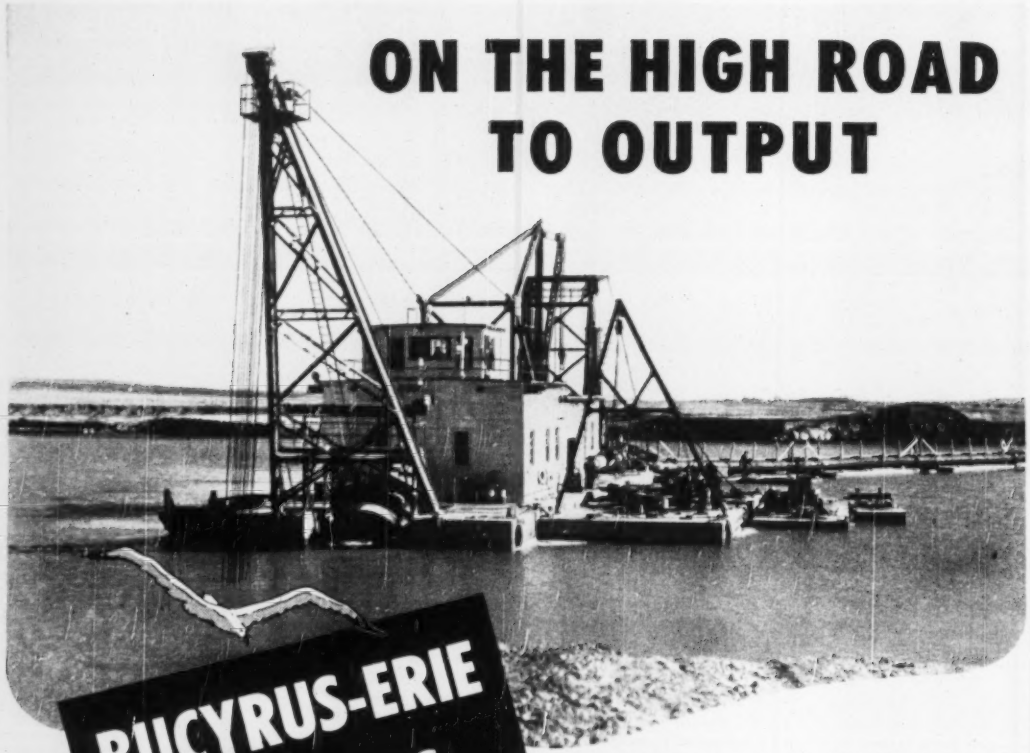
USS TRADE MARK

AMERICAN BRIDGE

UNITED STATES STEEL

ON THE HIGH ROAD TO OUTPUT



BUCYRUS-ERIE DREDGES

YOU'LL be heading for profits when you select Bucyrus-Erie to build your dredge. Here's why:

MASTERS OF DREDGE DESIGN. Your Bucyrus-Erie dredge is designed for its work. Job requirements are thoroughly investigated beforehand. A few of the many considerations given careful attention are: wanted output; maximum and minimum digging depths below water level; prevailing marine or fresh-water conditions; types of material to be handled; shortest and longest discharge lines needed; kind of fuel or power available. Guided by a complete analysis, and backed by long experience, Bucyrus-Erie engineers give you the "years ahead" design that means big output on a long-term, economical basis.

FINEST MATERIALS. From Bucyrus-Erie's laboratory come the special steels and the on-the-spot control that assure the continued high quality of castings produced in the company's steel foundries. The work of the flame-hardening and heat-treating shops receives the same constant laboratory control. Result: your Bucyrus-Erie dredge is made of the very finest in materials.

SUPERIOR CRAFTSMANSHIP. In Bucyrus-Erie's own machine, forge and erecting shops, shop men skilled in years of dredge building know-how make sure that the finished machinery will live up to its design.

Your best guarantee of a successful dredge is the selection of Bucyrus-Erie Company as its builder.

SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

31050

UNIT PRICES BID BY CONTRACTORS

Machine shop and warehouses at Coulee Dam

Instead of the usual lump sum bids on buildings, the Bureau of Reclamation asked for unit price bids on construction of buildings and installation of utilities at Grand Coulee Dam, Wash., June 1. Only two bids, 11.5% apart, were received. The low of $1,487,044 is 25% above the engineer's estimate.

Part of the Columbia Basin Project, these buildings are in the industrial area near the left abutment of Coulee Dam, about 30 miles northeast of Odair, Wash.

The job consists of completing Warehouse A—the foundation, basement, substructure and part of the superstructure already exist—and Warehouse B—foundation and basement built—installing equipment and facilities and constructing connecting passageway; constructing reinforced concrete machine shop with exception of installing machinery, monorails and terrazzo floors, reinforced-concrete central heating plant with electro-type water heating plant and necessary equipment, and substation yard including concrete retaining wall, gravel surfacing and chain link fence; erecting prefabricated steel fire station; installing concrete drainage pipe, welded wrought-iron heating pipe lines, cast-iron water-supply lines and metallic and nonmetallic conduit; surfacing of parking area and repairing concrete surface on top of dam.

Work had to start within 30 days after proceed notice. The completion times and penalties are divided as follows:

Job	Days	Penalty
Warehouse A	180	$50 00
Warehouse B	180	50 00
Fire Station	180	50 00
Dam repairs	120	20 00
Park & serv areas, pipe & conduit SE industrial area serv rd	180	50 00
Machine shop, ind w. i. heat pipe lines, util tunnels	360	200 00
Central heat plant & substation yard	360	50 00
Remaining w.i. heat pipe lines for warehouses, fire station	360	30 00
Remainder of work	420	50 00

Minimum wage rates are: bricklayers, $2.75 an hour; carpenters and cement finishers, $2.20; electricians, $2.35; ironworkers and sheet metal workers, $2.25; common laborers, $1.60; plasterers, $2.55; truck drivers, $1.60-2.15.

The government furnishes all sand, lubricants and other materials where the unit prices below show "i", for install, or "p", for place, without "f" for furnish. The bidders were:

1 Morrison Knudsen Co., Inc. and Peter Kiewit Sons Co., Seattle, Wash. (contract)	$1,487,043.95
2 Puget Sound Bridge & Dredging Co., Seattle	1,680,129.50
Engineer's estimate	1,418,941.00

Items		Quantity	Unit Prices 1	2
Excavation				
For struc, com	cy	150	$10 00	$5 00
For struc, rock	cy	35	10 00	20 00
Mach shop, com	cy	7,100	5 00	2 50
Mach shop, rock	cy	3,000	5 00	7 50
Rdwy, util struc, all classes	cy	670	20 00	15 00
Trenches, com	cy	2,000	1 00	3 00
Trenches, rock	cy	10	1 00	20 00
Rdways, serv & Park areas, all cl	cy	1,500	3 00	1 50
Borw pits, com	cy	320	3 00	1 50
Wstrg, embank, rdways, serv & park areas Mgal		50	6 00	5 00
Backfill	cy	6,500	3 00	3 50
Compact backfill	cy	6,500	3 75	4 00
Plac grav fill	cy	500	15 00	13 00
Grass surf	sy	1,250	24	30
Conc excav	cf	130	15 00	30 00
Remov concr	cy	30	34 00	25 00
Drill holes in conc; grout dowel bars in place	lf	200	6 00	5 00
Pl cr rock ballast	T	7,000	1 00	1 25
Pl cr rock, top crse & Keystone	T	3,800	1 50	2 00
Asph-conc pav, for ware-house floors	sy	7,800	2 10	2 25
Asph-conc paving				
Type "B"	sy	30,000	1 20	1 50
Type "C"	sy	38,500	1 15	1 10
Asph for asph-conc pav, furn	T	450	50 00	60 00
Conc pipe, 8" furn, const drains with uncmt joints	lf	260	1 70	2 00
Conc pipe, cmt joints				
12" furn & lay	lf	1,130	3 00	3 50
8" f & i	lf	190	2 00	2 50
6" f & i	lf	160	1 60	2 00
Reinf bars, f & pl				
1" & larger	lb	111,000	0 115	12
⅞" inc	lb	122,000	0 115	12
¾" & smaller	lb	215,000	0 125	11
Concrete in				
Mach shop footgs, fndtns	cy	1,300	28 00	35 00
floor slabs	cy	290	37 00	42 50
util tunnels	cy	350	26 00	35 00
superstruct	cy	300	65 00	70 00
Cent heat plant & fire station	cy	3,000	111 00	125 00
Armord pipe & conduits	cy	130	94 00	90 00
Warehouses	cy	290	31 00	30 00
Minor struct	cy	130	70 00	77 00
Drypack mortr in conc in recesses	cf	260	117 00	120 00
Control joints		80	29 00	32 00
Const type A	lf	300	1 00	5 00
Const type B	lf	130	3 50	5 00
Joint filler, f & pl				
½" corkboard	sf	1,300	2 20	2 00
½" & ¼" preform bit-fiber	sf	2,500	55	50
Metal seals, f & pl				
Type V	lf	670	2 00	3 00
Type X	lf	1,260	1 75	2 50
Rubr pl strips, ties	lf	50	2 00	2 25
6" thick insul bd pl on st roof decks	sf	21,300	06	07
conc roof decks	sf	7,000	06	07
Coal-tar satur-felt roofing	sf	28,300	0 0615	08
Asph-emul damproofg, apply 2-coat	sy	700	55	50
Roofed-conc finish on floors	sy	3,200	7 50	7 00
Conc wall bases	lf	340	1 85	2 00
Asph tile, f & i	sf	3,100	50	45
Asph curve bases, f & i	lf	480	60	55
Wd-block floor, f & i	sf	2,100	75	1 00
Glass-blk panels, i	sf	2,660	1 80	2 00
Metal r cords, f & i	sf	50	4 85	5 00
Partitions				
Metal rm, f & i	sf	550	4 85	5 00
Mtl toilet-stall & urinal	lf	60	18 00	20 00
St framework	lb	2,000	11	10
Mtl lath & 3-coat plaster	sy	600	10 00	11 00
Susp mtl lath, 3-ct plaster ceils	sy	125	11 50	12 00
Doors, f & i				
Large st swing	sf	375	9 85	10 00
Std st swing (ol conc walls	sf	275	6 20	6 00
plaster partns	sf	200	6 20	6 25
St rolling	sf	150	5 25	5 50
St sliding	sf	280	6 20	6 25
St sash windows, i	sf	1,850	63	60
St stay louvers, i	sf	200	74	75
Compltg warehse A	ls		98,500	145,000
Compltg warehse B	ls		126,500	175,500
Fire sta, f & erect	ls		16,750	20,000
St & wi pipe, fits and valves				
2" smaller, furn	lb	18,500	44	50
3" & 4", f	lb	37,000	48	50
6" larger, f	lb	14,000	37	40
2" smaller, ins	lb	47,500	55	50
3" & 4", i	lb	11,500	27	30
6" larger, i	lb	31,000	27	30
Chrom-pl pipe coupl, supports & escutcheon plates, f & i	lb	1,200	3 00	3 25
C I bell & spigot pipe, fits, & vlvs, f & i	lb	5,000	35	40
C I soil pipe, fit, i	lb	8,000	35	30
Cntr pumps, i	lb	1,100	900	1 000
Hot-wate heats, i	lb	10,000	35	25
Steel tanks, i	lb	8,500	18	20
Fire hydrants, remov and relocate	ea	2	210 00	250 00
Pipe, remov & salv	lb	6,300	15	20
Roof & floor drains; roof-stack flash sleeves, i	lb	1,000	27	30
St pipe hangers & supports, f & i	lb	2,500	2 70	3 00
Indoor fire-hose cabinets & equip, i	ea	5	59 00	65 00
Insul conc around heat pipe lines	cy	60	165 00	175 00
2-ply waterpr for heat pipe lines, pl	sy	250	2 30	2 50
Molded-type pipe covg, f & i	lb	1,600	85	90
Struct st, erect in mach shop	lb	250,000	05	0 055
cent heat plant	lb	8000	001	07
St roof decks, i	sf	21,350	25	30
Crane, i	lb	225,000	04	05
Track rails, i	lb	30,000	05	06
Embed mtl frames for ft wall, roof openings, i	lb	2,000	30	30
Mtl hatch cov, i	lb	3,000	20	25
Mtl rails, i	lb	6,200	40	35
Mtl saf tread, f & i	lf	300	4 50	4 00
Misc mtl work, i	lb	10,000	32	30
Lavatories, f & i	ea	11	135 00	110 00
Kitchen sink, f & i	ea	1	120 00	115 00
Water closet, f & i	ea	16	106 00	110 00
Urinals, f & i	ea	11	130 00	110 00
Serv sinks, f & i	ea	3	150 00	125 00
Wash fountain, f & i	ea	1	470 00	500 00
Shower cab, f & i	ea	1	385 00	400 00
Stor wate heat, i	ea	6	60 00	50 00
Elec drink wate cool, i	ea	3	75 00	80 00
Toilet paper holdr, f & i	ea	16	18 00	20 00
Paper towel cabinet, f & i	ea	10	20 00	20 00
Heat & vent sys				
Sheet mtl air ducts, f & i	sf	10,000	1 30	1 25
Exhs, waste-dr supply exhaust, circ i	lb	1,500	16	15
grille, register, vent panel, roof vent, air diffuser, mtl louvr damp, i	lb	800	11	30
Air filters, i	lb	150	23	25
Heat equip, i	lb	15,000	26	25
Controls in mach shop, i	ls		3,250	3,000
Auto fire-detect sys in mach shop, f & i	ls		3,100	1,000
Embed elec mtl conduit, f & i				
½" diam	lf	2,310	1 67	1 70
1"	lf	7,600	2 00	1 75
1½"	lf	2,300	2 35	2 25
2"	lf	1,050	2 80	2 50
2½"	lf	1,270	2 50	3 00
3"	lf	600	3 40	3 50
3½"	lf	800	4 90	5 00
Exposed elec mtl conduit, f & i				
½" diam	lf	1,350	1 60	1 75
1"	lf	3,900	2 00	1 90
1½"	lf	1,050	2 00	1 90
1¼"	lf	600	2 10	2 50
1½"	lf	50	5 00	3 00
2"	lf	20	5 10	5 00
2½"	lf	150	5 90	6 00
2" embed elec non-mtl conduit, f & i	lf	5,500	1 50	1 75
3"	lf	1,000	1 60	1 50
Elec conductor, f & i	lb	1,275	2 50	2 00
Grounfg mstl, f & i	lb	2,550	2 50	2 00
Crane runway conductors, i	lb	2,000	15	16
Lighting fixtures, i:				
Incan lamp type	ea	510	10 00	10 50
Fluores lamp	ea	113	18 00	19 00
Comb incan-mercury vapor type	ea	108	35 00	30 00
Light transformr, i	lb	18,850	20	25
Elec equip & sp, i	lb	10,000	1 40	1 50
Guardrails, const	lf	360	2 75	3 00
Chain-link fence, substa yd, f & erect	lf	300	7 00	6 50
Trans mstl betw Odair & mill & job site	T	500	11 50	10 00

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

WATER SUPPLY

BIDS ASKED

O., Salem—B. A. 8/22—City, c/o WW Supt., City Hall, Cont., No. 2, WW improv., 20 in. water transmission main. Plans deposit $25. Tile Chester Engineers, 210 East Park Way, Pittsburgh 12, Pa., engrs. CD 6/30/49.

Ga., St. Simons Island—B. A. 8/24—Glynn Co., deep well, approx. 800 ft. deep, one 500 gpm turbine type deep well pump. Plans deposit $10. J. B. McCravy Eng. Corp., 22 Marietta Street Bldg., Atlanta, engrs.

Md., Loch Raven—B.A. 8/24—State Dpt. P. Improv., 504 Park Ave., Baltimore, Zone 1, water and sewer extensions 8 in. str. clay pipe, 2,250,000 gal. setting tank, flow control bldg. and roof extensions, etc., Md. Training School for Boys, $175,000. Plans deposit $25. E. Douglas Ambrose, Assoc., 212 Washington Ave., Towson, engrs. John B. Folk, 506 Park Ave., Baltimore, Zone 1, cn. engr. state.

Mich., Ann Arbor—B. A. 8/24—City, W. F. Bandemer, pres. Water comm., 218 E. Huron St., 1 story, 17x24 ft. Steere Farm Booster Pump Station, concrete fdn., setting pump valves, piping, installing motor controls, three 100 kva transformers, 500 ft. electric service line. Plans deposit $10 refundable. Ayres, Lewis, Norris & May, 506 Wolverine Bldg., engrs.

N. Y., New York—B.A. 8/24—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, relocation of water mains and sewers on Queens approach to the new Vernon Avenue Bridge over Newton Creek, reconstruction of sewers and water mains on Kroon approach to new Vernon Ave. Bridge over Newton Creek in Queens Boro. Plans deposit $20 each.

† Utah—B.A. 8/29—Bureau Reclamation, Dpt. Interior, Provo, constr. of Terminal Reservoir, Salt Lake Aqueduct Provo River Proj., near Salt Lake City, Spec. 3119. Michael W. Straus, comr. adv. CAW 8/10.

LOW BIDDERS

▲ Tex., Dallas—City, City Hall, addn. work on Carrollton Water Plant from 3 to 5 mgd, Lee & Grant Natgun Lott Bldg., Dallas, Whittle Constr. Co., 3102 King, Rox. $2,088,989. Bids 7/25. Awarded 8/4, City #13, under LB.

Que., Montreal—City, admin., water main between low-level pumping station at foot of Atwater Ave. and McTavish St. reservoir, from Frank Ross Constr. Ltd., 6004 Louis Hemon St., Montreal. Approx. $995,252. CD 6/27.

CONTRACTS AWARDED

N. J., Newark—City Comm., Newark, 30 in. rein. conc. cast with steel lining, 8,120 ft. and 16 in. to provide Ridge Street bypass with city water to Neptune Constr. Co., 100 Riverside Ave., $224,050. Awarded 7/11. CD 1/17/46.

Tex., Henderson—City C., water main extens., etc., to Overall Bros., Jonesville, $36,660.

Tex., Humble—Sy. water distr. lines. Purchase and inst., $46,900.

Tex., San Antonio—L. J. Burke & Sons, 4220 S. Zamarora St., water lines, facilities, on 225 acre tract off Salado Creek Area. Owner builds. Approx. $40,000. CD 7/21.

Tex., San Antonio—W. R. Reid, 4002 Timon St., Corpus Christi, and Hatch L. Elder, 423 Mayfield, water distr. lines. Owner builds. Approx. $35,000. W. W. McClendon & Assoc., 127 N. Staples St., Corpus Christi, engrs.

Alta., Bonnyville—Municipality, water mains, trunk to Paint Constr. Co. Ltd., 10603 109 St., Edmonton, $55,000. Bids 7/24. CD 5/24.

Alta., Hardisty—Municipality, water sys. improv., $40,000.

Ont., New Hamburg—Municipality, waterworks ext. to Wilmot Creek Valley, $111,121. Proctor & Redfern Ltd., London, $50,000. Bids 7/24. CD 7/10.

SEWERS, WASTE DISPOSAL

BIDS ASKED

O., Toledo—B.A. 8/22—City, B. R. MacRitchie, service dir., City Hall, Jackson St., S. St. Clair St., Avondale Ave. Division St., Michigan St., and 2 alleys, resurf., 3 alleys. Plans deposit $10. M. J. Curtis, Toledo, city street div. engr. CD 10/17/44.

Tex., Pasadena—B. A. 8/25—City and Harris Co., c/o Court House, Houston, concrete paving 4-lane with service for access road leading into Pasadena Tunnel, Richey St., $144,000. Geo. S. Smith, Pasadena, city engr. CD 6/23.

† Oregon—B.A. 9/1—U. S. Eng., Pittock Bloc, Portland, constr. 3x11 ft. roadway, Aspen steel-reinforced bridge over North Santiam river on Idlewood Creek-Elkhorn Rd. near Mt. Cleveland, 35-026-51:27. Col. D. S. Burns, Pittock Bloc, Portland, engr.

Tex., Fort Worth—Bids Asked—Taylor-Todd Corp., First National Bank Bldg., constr. and pave streets, near Quartermaster Depot. $80,000.

Tex., Houston—Bids Asked—Carolina Gardens Development Co., Inc., 2401 Bridgett St., street constr. and paving, $100,000. CD 7/27.

LOW BIDDERS

New York—Bureau Contracts & Accounts, Albany, project withdrawn, Aug. 2, b. conc. optional 10 mi. Prospect-Herkimer Co. line Pt. 2 Oneida Co. Line-Willmurt Proj. 5281 (1)-21. Contr. No. FAS 5450-9, Herkimer and Oneida Counties. CD 7/14. Will readvertise.

▲ New York—Bureau Contracts and Accounts, Albany, Aug. 2, c. conc. pavement 4.474 mi. Bell-Wellsville Proj. 1 F 421 (5) Contr. 8172, SH 5253, Proj. F 284-2(5), F 421 (5). Contr. ARC50-16, Allegheny Co., Potter-De Witt Corp., Pavilion, $773,991.**** C. grav. 2.08 mi., c. conc. pavement 25 ft. wide, 4.32 mi. b. conc Type 1A, Opt. 1.08 mi.; Hy. Sep. Alpha-I-beam two at 52 ft. and two at 36 ft. R.R. sep. welded girder three SP 270 ft., 73 ft. span Alpha I-beams 3 span 80 ft. each Alpha I-beam Ontario Thruway (Monument)-Port Byron-Victoria Thruway (Port Byron-East Auburn St., Village of Montezuma, N. Main St., Village of Port Byron, Proj. F1 1071 (5)C (in), Contr. 07 50-4, 07 50-5, ST 50-2, ST 50-3, Cayuga Co., from Baughman & Blair, Inc. and Potter Dev Witt Corp., Pavilion, $3,568,305.

c. conc. 0.88 mi. Ontario Thruway-Walden Ave. connection, Proj. U 1095 (1), Contr. ST50-1, Erie Co., from Peter Cooper Corp., Depew, $231,291.**** steel rdwy. struct. 0.14 mi. misc. work 0.22 mi., C. conc. two at 29 ft., two 36 ft., and variable 0.46 mi. pedestrian overpass 3 span I-beam 156 ft. each I-beam two Span 38 and 44 ft. I-beam (PG Fascia) 2 span 38 and 46 ft. plate girder 0.61 mi. Van Wyck Expressway (Hoover Ave. 87 Ave.) Contr. 10 Proj. U 1045 (12) Contr. FA (W) 50-3, Queens Co., from Gulf Contg. Co., Inc., 33-13 Lawrence St., Flushing, $3,473,974. CD 7/14.

Tennessee—State Hy. Dpt., Nashville, wide, four lane Hy. paving 2.6 mi. Nolensville Hy. from Carson St. to Wheeler Ave., Davidson Co., to J. B. Michael & Co., 1021 Heswood St., Memphis, $742,230. Under L.B. grading, etc., 4.4 mi. from Minor Hill to Alabama Line, Proj. R-7010 (12) and 6.8 mi. from Tarpleys Shop, Rte. 7 to point South, Proj. R-7149 (12), from Blaylock & Johnson, Inc., Knoxville, $50,044.**** Hamilton Co. projects to Wesco Paving Co., Volunteer Bldg., Chattanooga, $91,513. Grand total $883,787. Bids 7/21. Awarded 7/27. CD 7/11, under LB.

CONTRACTS AWARDED

Maine—State Hy. Comr., Augusta, bit. conc. surf. 4.37 mi., F.A. Proj. F-027(1) Part, Lincoln to W. H. Hinman, Inc., North Arnold, $565,441.**** bit. macad rst. 2.495 mi., F.A. Proj. F-025-2 (1) and F-025-2 (2), New

BRIDGES

BIDS ASKED

Que., Montreal—B.A. 8/22—B. Wheelwright, ch. engr., Canadian National Rys., 360 McGill St., reinf. con. viaduct between St. Antoine and St James Sts. Plans deposit $100.

O., Dayton—B.A. 8/24—City, at office Dpt. Service & Bridges, 500 Municipal Bldg., 5 St. Bridge $124,428 and Dayton-View Bridge $44,439, over great Miami River Ridge Ave. Bridge over Stillwater River, $79,000. CD 1/30/46.

† California—B.A. 8/29—Bureau Reclamation Dpt. Interior, Redding, dismantling and removing existing bridge and the constr. of earthwork, foundations and superstructures for new Sacramento River bridge, Shasta Dam, Central Valley Proj., north of Redding near Shasta Dam, Spec. 3135. Michale W. Straus, comr.

LOW BIDDERS

▲ New Jersey—New Jersey Turnpike Auth., War Memorial Bldg., Trenton, Aug. 3, Contr. 22, constr. work from the Turnpike viaduct over the railroads (Oak Island Yard to Turnpike Bridge) Passaic River, incl. interchange ramps at Raymond Blvd., Essex Co., from Construction Aggregates Corp. & Peter Kiewitt Sons Corp., 1 E. 42 St., New York, N. Y., $6,582,635. CD 7/24.

STREETS AND ROADS

BIDS ASKED

O., Toledo—B.A. 8/22—City, B. R. MacRitchie, service dir., Courthouse, Jackson St., S. St. Clair St., Avondale Ave. Division St., Michigan St., and 2 alleys, resurf., 3 alleys. Plans deposit $10. M. J. Curtis, Toledo, city street div. engr. CD 10/17/44.

Tex., Pasadena—B. A. 8/25—City and Harris Co., c/o Court House, Houston, concrete paving 4-lane with service for access road leading into Pasadena Tunnel, Richey St., $144,000. Geo. S. Smith, Pasadena, city engr. CD 6/23.

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PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $28,000; other public buildings $50,000; industrial buildings $60,000; other buildings $250,000.

Classes of Construction

(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

Sharon and Mercer, to H. E. Sargent, Inc., Stillwater. $241,415**bit, conc. rd. 0.720 mi., F.A. Proj. S-0143 (1), Waldoboro to A. P. Wyman, Inc., Box 23, Waterville, $57,525. Grand total $864,381. CD 7/24.

▲ Maryland—State Rds. Comn., Baltimore, 5 mi. extension of dual hy. for Rte. 40 between Baltimore and Frederick, to Williams Contr. Co., Bengies, Baltimore. $1,439,055. CD 5/8 under LB.

N. M., Hobbs—City, paving 172 blocks streets, to Wylie Brothers, Box 4025, Albuquerque. $577,451. Est. $613,905. Awarded 8/2.

Tex., San Antonio—E. J. Burke & Sons, Inc., 4220 S. Zarzamora St., constr. streets incl. concrete curbs and gutters, on 225 acre tract off Salado Creek area. Owner builds. $68,000. CD 7/5.

Tex., San Antonio—W. R. Reid, 4002 Timon St., Corpus Christi, and Ralph L. Eiser, 432 Meadow Lane, asphalt, type paving streets. Owner builds. $64,445. W. W. McLendon & Assoc., 127 N. Staples St., Corpus Christi, engrs.

Wash., Seattle—City, County—City Bldg., Seattle, Zone 4, c. conc. streets in area between 35 and 55 Aves. N.E., 55 and 75 Sts., to Seattle Contg. Co., 101 Nickerson St., Seattle, $751,661. Est. $846,707. Bids 7/19, awarded 7/20. CD 7/25, under LB.

Alta., Edmonton—Municipality, paving various streets, to Sterling-Davis Co. Ltd., 7320 99 St., Edmonton, $122,914. Bids 7/25. CD 7/19.

EARTHWORK, WATERWAYS

BIDS ASKED

† Iowa and Nebraska—B.A. 8/22—U. S. Eng., 1709 Jackson St., Omaha. Zone 2, constr. strengthening, replacing approx. 11,850 lin. ft. dikes, revetment, etc., in or adjacent to Missouri River, Pin Hook-Nebraska Bends, Fremont Co., Ia. and Otoe Co., Neb., CIVENG 25-066-51-4.

† Indiana—B.A. about 8/23—U. S. Eng., 830 W. Broadway, Louisville 3, Ky., 27,000 cu. yd. levee embankment, 9 acres fertilizing and seeding, etc. for Deer Creek Levee Repairs, Carroll Co., CIVENG 15-029-51-13; 96,000 cu. yd. levee embankment, 23 acres fertilizing and seeding, etc. for Island Levee Repairs, Sullivan Co., CIVENG 15-029-51-12; 303,000 cu. yd. levee embankment, 42 acres fertilizing and seeding, Niblack Levee Repairs, Knox Co., CIVENG 15-029-51-11.

† Tennessee—B.A. 8/23—U. S. Eng., P. O. Box 1070, Nashville, technical provisions for Village Power Supply T. Eisenhower General Hosp. Dam, Inc. No. CIVENG 40-508-51-7; adv. ENR 8/17.

† New Jersey—B.A. On Or About 8/24—U. S. Eng., 121 N. Broad St., Phila. 1, Pa., maintenance dredging in Absecon Creek, about 5 mi. northwest of Atlantic City, Inc. No. CIVENG-36-109-51-3.

† Illinois and Missouri—B.A. 8/24—U. S. Eng., 808 U. S. Court House & Custom House, 1114 Market St., St. Louis 1, Mo., constr. approx. 3300 lin. ft. piling dikes and 6,630 lin. ft. bank protection in Mississippi River at Goose Island, Miles 32 to 40; Chester miles 109.5 to 116, and Kaskaskia Island, Miles 109.5 to 116 under Item 1 at Cape Girardeau, Mo.; Miles 47 to 57 and Ste. Genevieve, Mo., miles 116 to 127 under Item 2; all mileage above mouth of Ohio River, Inv. CIVENG-23-065-51-4.

† Missouri—B.A. 8/24—U. S. Eng., 808 U. S. Court House and Custom House, St. Louis, Zone 1, constr. timber piling clump dikes at Goose Island, Chester, Kaskaskia Island and bank protection at Cape Girardeau, Ste. Genevieve, CIVENG 23-065-51-4.

† Oklahoma—B.A. 8/24—U. S. Eng., P. O. Box 61, Tulsa, Zone 2, switchyard and equipment for Fort Gibson Dam, Muskogee Co., $300,000. CD 7/24.

† South Carolina—B.A. 8/24—U. S. Eng., Customhouse, Charleston, maintenance dredging in The Municipal Yacht Basin, Ashley River, Charleston, Serial No. CIVENG-38-081-51-1.

Ont., Wheatley—B.A. 8/24—Acting Secy., Dpt. P. Wks., Hunter Bldg., Ottawa, dredging. Approx. $69,000. R. Blais, c/o owner, engr.

AIRPORTS

LOW BIDDERS

La., Shreveport — AIRPORT TERMINAL BLDG. — City Council, Shreveport, 2 story, brick, concrete, steel terminal bldg. for Shreveport Municipal Airport, F. A. Proj. 9-16-019-005, from Southern Builders, Inc., Box 1815, $686,500. CD 7/12.

Mo., St. Joseph—ADMINISTRATION BLDG.—City Aviation Bd., St. Joseph, rejected bids June 6, 2 story, 50x100 ft. steel, concrete block, brick airport administration bldg. with penthouse and control tower, Rosecrans Field, $280,000. Will re-advertise. CD 6/2.

CONTRACTS AWARDED

La., Shreveport — AIRPORT TERMINAL BLDG. — City Council, 2 story, brick, concrete, terminal bldg. from Shreveport Municipal Airport, F. A. Proj. 9-16-019-005, to Southern Builders, Inc., Box 1815, $686,500. Bids 7/27, awarded 7/31. CD 8/3, under LB.

Tex., Jasper—AIRPORT—Jasper Co., Jasper, airport improv. Owner builds. $70,000.

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PUBLIC BUILDINGS

BIDS ASKED

Ind., Hammond—SCHOOL—B.A. 8/22—Bd. School Trustees, C. N. Scott, pres., 1 story, humt., brick Parrish Elementary School, $250,000. Plans deposit $20. W. S. Holmes Co., Olds Tower Bldg., Lansing, Mich., archt. CD 3/9.

Ia., Waverly—SCHOOL—B.A. 8/22—School Dist. of Waverly, Waverly, 1 and 2 story, steel, concrete, brick Washington Irving School, $300,000. Plans deposit $50. Perkins & Will, 309 W. Jackson St., Chicago, Ill., archts. CD 2/24.

Mass., West Springfield—SCHOOL—B.A. 8/22—Town, Stuart Bldg. Comm., John Ansley Elementary School, about $350,000. Plans deposit $50, Bernard Dirks, Montague, archt. CD 12/7/44.

Mich., Ida—SCHOOL—B.A. 8/22—Twp., Bd. Educ., brick, steel, 12 classroom school, $250,000. Lewis C. Kingscott & Assoc., Inc., 511 Monroe St., Kalamazoo, archts.

Wis., Spooner—SCHOOL—B.A. 8/22—Bd. Educ., Spooner, 2 story, 70x160 ft., steel, brick cut stone high school, 8000 concrete floor and floors. Plans deposit $75. J. J. Mentzer Matson, 616 Main St., Racine, archt. CD 12/14/49.

▲ N. J., Hoboken—HOUSING—F.A. 8/22—Housing Authority of City of Hoboken, Dr. Fazio, exec. dir., City Hall, construction, foundations, piling, etc. for Garden Columbus Housing Proj., incl. 98 units, Hoboken 4-6434 & 9 Adams and Jefferson Sts., $1,000,000. CD 7/20.

N. Y., Queens Village—LIBRARY—B.A. 8/23—Dpt. Pub. Wks., Municipal Bldg., New York, Zone 7, constr., Queens Blvd. Branch Library of Queens Boro Public Library. Plans deposit $25. CD 6/17/de.

Pa., Allentown—DIETARY, etc.—B.A. 8/23—General State Auth., 18 and Herr Sts., Harrisburg, general const., heating, plumbing, electrical, erection or construction of addns. to and revamping dietary facilities and stores at Allentown State Hospital, $560,000. Plans deposit $10 each. Lange & Everett, 125 N. 4 St., archts. A. F. Jones, c/o owner, ch. engr. CD 9/24.

▲ Que., Hull—PRINTING BUREAU—B.A. 8/23—C. A. Runeberg, acting secy., Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., superstructure of National Printing Bureau, Boy. Approx. $6,500,000. G. Brault, c/o owner, archt., and E. Cormier, 1675 Ste des Seigneurs Rd., Montreal engr. Plans deposit $100. CD 7/7/48.

Que., Quebec City—CENTRAL HEATING PLANT—B.A. 8/23—Acting Secy., Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., central heating plant, etc., Savard Park Hospital. Approx. $200,000. Plans deposit $50. G. Brault, c/o owner, archt. CD 6/30.

Ind., Fort Wayne—SCHOOL—B.A. 8/24—James E. Graber, Huntertown Washington Twp., Fort Wayne, school. Plans deposit $10. Albert Hester, Gettle Bldg., archt. CD 1/27/49.

Kan., Topeka—SCHOOL—B.A. 8/24—Bd. Educ., Topeka, grade and junior high school $500,000. R. A. Cordinier, N. C. Bldg., archt. CD 3/17.

Md., Camp Detrick—PLANT TESTING BLDGS.—B.A. 8/24—U. S. Eng., First and Douglas Sts., N.W., Wash. 25, D. C., plant testing bldgs., ENG 49-080-51-6, Inv. CD 6/2e.

Md., Loch Raven—CUTTAGES and SCHOOL—B.A. 8/24—State Dept. P. Improv., 506 Park Ave., Baltimore. Zone 1, 3 story, 110x40 ft. H-shaped concrete block, brick and stone of four cottages and training school for boys, $900,000. Plans deposit $50. Edw. H. Gilbert, 1214 Equitable Bldg., Baltimore 2, archt. Van Rensselaer Saxe, 100 W. Monument St., Baltimore, struct. engr., James Poter, 10 E. Pleasant St., Baltimore, mech. engr., John B. Funk, 506 Park Ave., Baltimore, ch. engr., State Md. CD

▲ Wis., Milwaukee—SCHOOL—B.A. 8/24—Bd. School Director, 1111 N. 10 St., Zone 3, 2 story, L-shaped, 200x230 ft., steel, brick, cut stone, 24th Street School, $1,250,000. CD 5/9. 1 story, 200x230 ft., L-shaped, steel, brick, cut stone 53rd Street school. Plans deposit $50 each. Grassold & Johnson, 734 N. Jefferson St., Zone 2, archts. and G. E. Wiley, c/o owner, archt.

Pa., Retreat—STORAGE, etc.—B.A. 8/10—General State Auth., 18 and Herr Sts., Harrisburg, storage bldg. and refrigeration plant at Retreat State Hospital, $200,000. Plans deposit $10 each. Carl J. Schmidt, 198 N. Main St., Wilkes-Barre, archt., A. F. Jones, ch. engr.

▲ † N. M., Los Alamos—UTILITIES—B.A. 9/—U. S. Atomic Energy Comm., Los Alamos, 140 line utilities, incl. roads, water mains, gas mains, sewers, sewer treatment plant, steam plant, underground 13-KV electrical distr. sys., etc. Proj. C-TA-16. $1,600,000 to $2,000,000. Plans deposit $100. Extended date, 8/28. CD 7/28.

▲ Neb., Omaha—HOUSING—B.A. 9/12—Omaha Housing Auth., 1509 S. 10 St., housing proj., at 30 and Lake Sts., 2,000,000; housing proj., at 30 and Spencer Sts., $1,500,000. L. A. Daly Co., Insurance Bldg., archt. CD 7/19.

N. J., Union City—SCHOOL ADDN.—Bids asked October —Bd. Educ., 3410 Palisades Ave., three school addns., $350,000. Fred A. Ehasser, Union City, archt.

LOW BIDDERS

▲ Mo., Jefferson City—STATE HOUSE—State Bd. P. Bldgs., Bus. Forrest Smith, Aug. 4, 13 story humt., 71x147 ft., steel, glass blocks, aluminum, concrete, stone, 210,000 sq. ft. floor space state office Bldg.,

alternate bids on 11 story or 12 story on south side Capitol Ave. at Jefferson St., general contract from McDonald Constr. Co., 3829 W. Pine Blvd., St. Louis, $4,350,997 for 11 story or $4,017,372 on 21 story and basement; air conditioning, from J. Louis Groth, Columbia, $590,000; electrical work from J. Livingston Electric Co., 4857 Gravois Blvd., St. Louis, Zone 20, $380,000. CD 7/7.

▲ N. Y., Brooklyn—CITY PRISON and REMAND SHELTER—Dept. Pub. Wks., Municipal Bldg., New York, Zone 7, rejected bids July 12 on general contract City Prison and Remand Shelter, Atlantic Ave. Bounded by Smith and Nine Sts., L.B. $6,391,447; plumbing, L.B. $633,912; heating and ventilating, L.B. $725,750; electrical work, L.B. $387,852. Bids over estimate. CD 7/14, under LB.

Pa., Laurelton—HOUSING—General State Auth., 18 and Herr Sts., Harrisburg, Aug. 2, general contract, addtl. housing for girl patients, incl. 3 cottage type units, at Laurelton State Village, from Moyer Bros., 2609 Beale Ave., Altoona, $549,999. CD 7/11.

Pa., Rockview—KITCHEN—General State Auth., 18 and Herr Sts., Harrisburg, Aug. 2, general contract, for relocation of kitchen, refrigeration and related facilities at Sea Western State Penitentiary, from Moyer Bros., 2605 Beale Ave., Altoona, $340,999. CD 7/12.

CONTRACTS AWARDED

▲ Calif., San Francisco—HOUSING—Housing Auth. of City and San Francisco Co., 440 Turk St., 6 story, 27 unit, Ping Yuen Housing Proj., to Theodore J. Meyer, 200 Quint St., San Francisco, $1,931,343. Bids 6/27. CD 7/6, under LB.

La., Lake Charles—SCHOOL—Lake Charles School Bd., Orig. High School addn. and remodeling, lake, to T. Miller & Son, P. O. Box 921, $696,477.

Pa., Selinsgrove—COTTAGES—General State Auth., 18 and Herr Sts., Harrisburg, general contract, cottage for boys and cottage for girls at Selinsgrove State School for Epileptics, to Boyd M. Kipp, Selinsgrove, $568,576. Bids 7/26. Awarded 8/2. CD 7/31, under LB.

Ont., Fort Frances—HOME—Rainy River District Home for the Aged, Geo. Wall, secy., Fort Frances, 2 story, bsmt., 75-bed home for aged, central portion, 1 story laundry and boiler plant addn. to Wyatt Constr. Co., Ltd., 1110 Confederation Bldg., Winnipeg, Man. Approx. $375,000. Bids 6/19. CD 5/22.

Ont., Scarborough—INSTITUTE WING—Scarborough Collegiate Bd., Kingston Rd., Collegiate Institute wing, to Bennett-Pratt Ltd., 5 Maple Leaf Dr., Toronto. Approx. $275,000. CD 12/27/49.

COMMERCIAL BUILDINGS

SOON LETS CONTRACT

Ill., Chicago—OFFICE ADDN.—Society Vacuum Oil Co., 59 E. Van Buren St., Zone 4, soon lets contract, 1 story, 100x100 ft., steel, concrete, brick office top addn., $25,000. David S. Kluffer, 100 N. LaSalle St., Zone 2, archt.

LOW BIDDERS

▲ Neb., Omaha—HOME—St. Vincent's Retreat for Aged, 45 and Ames Ave., Aug. 5, general contract home for the aged, from Parsons Constr. Co., 512 Grain Exchange, $1,358,773. CD 8/8.

CONTRACTS AWARDED

Calif., Hayward—RESIDENCES—Stanley M. Davis, 640 Bancroft Ave., San Leandro, 51 residences on Barlow Dr., Lake Chabot Rd., Brook Court, in Castro Valley district, Owner builds. $275,600.

Calif., Sacramento—RESIDENCES—M. J. King Inc., 231 Franklin St., San Francisco, 82 residences in Del Paso Manor Units Nos. 5, 11 and 12, Owner builds, $516,600. CD 8/1/46.

Calif., San Lorenzo (near Hayward)—RESIDENCES—Ashland Homes Inc., 1901 Foothill Blvd., San Leandro, 111 residences on Empire Tulsa and Rutgers Sts., Vassar and Yorktown Aves. and Hesperian Blvd., Owner builds, $832,500.

Calif., San Mateo—RESIDENCES—David D. Bohannon Organization, 859 San Mateo Dr., San Mateo, 74 residences in Hillsdale Unit 4-A subdivision, Owner builds, $683,500. CD 2/20.

▲ Ill., Chicago—APARTMENT—The Communities Redevelopment Corp., c/o Raymond & Radz, archts., 101 Park Ave., New York, N. Y., garden apartments, to John W. Horwich & Sons, 30 Rockefeller Plaza, New York, N. Y., $1,000,000. Holsman, Holsman, Klekamp & Taylor, 39 S. State St., Chicago, Ill., assoc. archts.

Ill., Evanston—INTERNES HOME—St. Francis Hospital, 355 Ridge St., 4 story, 100x149 ft., brick, steel, concrete, internes home, to John Gebhardt & Sons, 30 W. Washington St., Chicago, Ill., Approx. $500,000. Bids 7/17. Awarded 7/26. CD 7/13.

▲ Ia., Des Moines—APARTMENTS—University Terrace Apartment Co., 406 Fleming Bldg., apartments to The Wertz Co., Inc., Fleming Bldg., $1,000,000. Haynes & Griffith, Fleming Bldg., archts.

▲ N. Y., Pleasantville—DWELLINGS—High Ridge Estates, c/o Harry L. Weiss, pres., 42 Stiese Ave., New Rochelle, 95 ranch-style dwellings, Bear Ridge Rd., Owner builds, $1,852,500.

▲ N. Y., Sayville—HOMES—Owner, c/o Norman Rauch, 84-41 Rodner St., Jamaica, 1,000 homes known as Sayville Shores on north side on Montauk Hy., extending north to Brook St., Owner builds, $5,000,000. Edwards & Stoye, 23 Main St., archts.

▲ O., Cincinnati—RESIDENCES—Myers Y. Cooper, 2647 Erie Ave., Zone 8, 25 two story, bsmt., brick residences; separate contracts, $1,250,000. Ward Franklin, c/o owners, archt.

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▲ O., Columbus—DWELLINGS—Grasmere Realty, Inc., 42 E. Gay St., 104 one story dwellings, S. Hampton Rd. and 3 dwellings on 330 Block of Dale Ave. Owner builds. Est. $1,000,000.

▲ Tex., Dallas—APARTMENT—H. Leslie Hill, 4333 Lovers Lane, 14 apartment. Owner builds. $1,275,000. CD 6/5.

▲ Tex., Fort Sam Houston—DWELLING UNITS—Commanding Officer, 4th Army, Fort Sam Houston, Construct, manage and finance 200 officers' dwelling units, Dodd Field, for Hus Hill & Assocs., Andrews Bldg., Dallas, (sponsors and owners), to Elliot Constr. Co., c/o Don Elliot, Room 812 St. Anthonys Hotel, San Antonio. Approx. $1,620,000. (Correction-contractor). CD 3/9.

Tex., Fort Worth—HOUSING—Mrs. Roy O. Martin, 533 Holt St., housing project. Owner builds. Approx. $250,000. CD 7/17.

▲ Tex., Houston—HOUSING—Dixie Builders, c/o Carl Sharp, 2422 Wordsworth St., low cost rental housing for negroes off La Porte Rd. Owner builds. Approx. $1,250,000. CD 7/31.

▲ Tex., Houston—APARTMENTS—Krauss & Zarger, N. Shepherd St., 184 unit apartment, off N. Shepherd, adjacent to Shepherd Gardens. Owner builds. Approx. $2,304,000. CD 8/3.

▲ Tex., Houston — HOUSING — W. W. McMillan, 79848 Harrisburg St., 100 dwellings units area of Southcrest Addn., Approx. $500,000; and 50 addnl. dwellings in sect. 3 just south of sect. 2. Approx. $500,000, in Southcrest Subdivision. Owner builds. CD 4/7.

Tex., Houston—HOUSING—D. J. Zaballo & Assoc., West Bldg., 100 addnl. housing units, vicinity Industrial area. Owner builds. $475,000. CD 11/24/49.

▲ Tex., San Antonio—HOUSING—F. M. Pierce & Ogden Klein, c/o Otis West, Brady Bldg., Houston, 300 housing units, Sect. 3, to Marion Barrett Constr. Co., 1903 Vista Lane, Austin. Approx. $1,800,000. CD 6/20.

Tex., San Antonio—DWELLINGS—Arthur J. Puig & Co., 517 W. Hildebrand St., 40 dwellings. Owner builds. Approx. $300,000. CD 7/21.

▲ Wash., Aberdeen—HOSPITAL ADDN.—St. Joseph Hospital, Aberdeen, 5 story, ground floor 45x188 ft., reinforced concrete hospital addn. to General Constr. Co., 3840 Iowa St., Seattle. $1,450,361, est. $1,000,000. Bids 6/28, CD 7/7, under LB.

▲ Ont., Hamilton—HOUSING—Robert Elliott Syndicate, c/o contractor, 375 unit housing development on eastern brow of mountain, on 86 acre site to Elliott Constr. Co., Ltd., Brucedle St. E., Hamilton; Approx. $3,000,000.

Ont., Hamilton—PREVENTORIUM—Hamilton Health Assn., W. H. Lovering, pres., Hamilton, children's preventorium at Mountain Sanatorium, to be called Holbrook Parke, to W. H. Cooper Co. Ltd., Hughston St., Hamilton. Approx. $500,000. Bids 7/24, CD 7/29.

INDUSTRIAL BUILDINGS

SOON LETS CONTRACT

Tex., Mart—WAREHOUSE, etc.—Limestone Co. Electric Co-operative, Mart, soon lets contract brick and hollow tile concrete frame storage, warehouse and shop, $75,000. Wyatt C. Hedrick, First National Bank Bldg., Fort Worth archt.

Alta., Edmonton—REPAIR BLDG.—J. P. Johnson, Canadian National Rys., Winnipeg, Man., soon lets contract car repair bldg., at Calder Yards.

Alta., Wainwright—TANK, etc.—J. P. Johnson, Canadian National Rys., Winnipeg, Man., soon lets contract mfg. plant, incl. 1 story 282 290 ft., factory, 42x51

CONTRACTS AWARDED

▲ Ala., Woodward—BLAST FURNACE—Woodward Iron Co., Woodward, blast furnace adjacent to its present No. 2 Furnace. Owner builds. $4,500,000.

Ind., Indianapolis—FACTORY—Paper Mfg. Co., S. and Willow Sts., Phila., Pa., 1 story 180x220 ft., brick, concrete structural steel factory, Shelby St. and National Ave., to Industrial Development Corp., 966 N. Meridian St., Indianapolis. Approx. $160,000. H. A. Bogard, 966 N. Meridian St., Indianapolis, engr. Awarded 7/27.

Ind., Lafayette—PLANT—Duncan Mfg. Co., F. Hy., mfg. plant, incl. 1 story 282x290 ft., factory, 42x51 ft., boiler house and 6x102 ft. office, all brick, structural steel, rein. conc. to The Austin Co., 620 N. Dearborn St., Chicago, Ill. Approx. $950,000. A. B. Engle, c/o contractor, engr.

▲ N. Y., Albany—STEAM ELECTRIC GENERATING STATION—Niagara Mohawk Power Corp., 15 Broad St., New York, Zone 5, general contract 160,000 kw. steam-electric generating station on west shore of Hudson River 1 mi. south of here, to Stone & Webster Eng. Corp., 49 Federal St., Boston, Mass., $27,000,000. CD 5/2.

Tex., Banham—FOUNDRY—Banham Iron Foundry Co., Banham, reconstruct main foundry. Purchase and Hire. $85,000.

▲ Tex., Port Arthur—REFINERY—Gulf Oil Corp., Gulf Bldg., Houston, 20 story, 148,000 sq. ft. fluid catalytic cracking unit refinery, to M. W. Kellogg Co., 225 Broadway, New York, N. Y., $8,000,000.

W. Va., Weirton—STORAGE, etc.—Weirton Steel Co., Weirton, constr. coal storage and reclaiming sys., to Koppers Co., Koppers Bldg., Pittsburgh, Pa.

UNCLASSIFIED

BIDS ASKED

Nebraska—RURAL DISTRIBUTION LINES—B.A. @ 2½%—K. B. P. Electric Membership Assn., Ainsworth, 443.3 mi. rural distr. lines in Brown, Cherry, Keya Paha and Rock Counties; $475,000. Raymond H. Reed & Co., Columbus, engr. CD 8/12/49.

Pa., Kutztown—STAIR TOWERS, etc.—B.A. @ 3½%—General State Auth., 18 and Herr Sts., Harrisburg, stair towers, renovating laundry bldg., relocating infirmary, etc., at Kutztown State Teachers College; $260,000. Plans deposit $10, each. Muhlenberg Bros., 113-A S. 4 St., Reading. A. E. Jones, c/o owner, in. engr. CD 12/23/49.

Ont., Muskoka—WHARF—B.A. 8/30—Acting Secy., Dpt. P. Wks., Hunter Bldg., Ottawa, wharf reconstr. at Beaumaris Island. Approx. $30,000. Plans deposit $20. R. Blais, c/o owner, engr.

Texas—NATURAL GAS MAINS, etc.—Bids Asked—Lone Star Gas Co., 1905 Wood St., Dallas, natural gas mains and rural distr. lines in Bandera, Center and Comfort; $60,000 each. CD 6/19.

LOW BIDDERS

New York—LIGHTING, etc.—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, Aug. 2, lighting and signs, 0.62 mi. Cross Bronx Expressway, Contr. 12A, Contr. FA CBF 50-2 Bronx Co., from The Westbach Corp., 1949 42 St., Long Island City; $57,000.

Wyoming—RURAL DISTRIBUTION LINES—Niobrara Electric Assn., Lusk, rejected bids July 27, 465.5 mi. rural distr. lines, C.-O. Eng. Co., 25 S. Grove St., Denver, Colo., engr. CD 7/10.

CONTRACTS AWARDED

Ill., Sterling—STREET LIGHTING, etc.—City, Esther Dondero, city clk., street lighting and traffic control sys., incl. 98 new street lights, 4 intersection traffic signals, etc., to Virgil Cook Elec. Co., DeKalb; $73,682. Bids 7/3. C. K. Willett, Sterling, engr.

Iowa—RURAL DISTRIBUTION LINES—Buena Vista County Rural Electric Co-operative, Miles Nelson, mgr., Storm Lake, 25 mi. rural distr. lines and 32 mi. tie lines, Buena Vista Co., own forces. Approx. $103,000. CD 6/30.

Kansas—RURAL DISTRIBUTION LINES—Caney Valley Electric Co-operative, Cedar Vale, 192 mi. rural distr. lines in Chautauqua Co., Pres. W. F. to C. & W. Constr. Co., Ada, Okla.; $204,529. Bids 7/19, CD 7/20.

PROPOSED PROJECTS

WATER SUPPLY

Fla., Stuart—City, Stuart, water works system extension, incl. pipe, Approx. $250,000. William Sydow, 2116 S. W. 25 St., Miami, consult. engr.

Ill., Jerseyville—City, water pumping plant extens., to source of supply, and water mains; $370,000.

Ill., Mount Prospect—City, City Hall, water works, $250,000. Consor, Townsend & Co., 351 Ohio St., Chicago, Zone 11, consult. engrs.

▲ N. C., Charlotte—City, H. A. Yancey, city mgr., City Hall, plans bonds July 24, enlarging, extends, to WW $1,750,000. CD 7/5.

Okla., Lawton—City, Lawton, voted bonds, enlarge water storage facilities, $190,000; WW extens., $750,000. Charles Gallagher, c/o owner, city engr. CD 6/22.

Okla., Purcell—City, Purcell, water works extens., $300,000. Eastman Eng. Co., American Natl. Bldg., Oklahoma City, consult. engr.

▲ S. C., Charleston—Comrs. Pub. Wks., 24 George St., approving of Back River and Foster Creek, construct diversion canal and WW tunnel; $6,900,000. F. B. McDowell, engr.

Tex., Atlanta—City, voted bonds July 29, WW, $225,000. CD 7/27.

Tex., Denison—City, Denison, defeated bonds, to improve storage tank and tower, $70,000; WW sys. renewal, notice, extens. $308,000.

▲ Tex., Houston—City, bond election Aug. 26 for San Jacinto Dam Project, filter plant, $4,500,000. San Jacinto Reservoir, $1,565,000; structure for San Jacinto Dam, $7,500,000; concrete lined canal 28 mi. from San Jacinto Dam to City limits, 28 mi. from here, $1,286,000; misc. extens. and improv. of water sys., $1,500,000; enlarging existing supply lines from San Jacinto Filter Plant to main sys. lines, $2,267,000; San Jacinto Dam Pumping Plant, $375,000; relocating various pipe lines, $439,000. Horner & Shifrin, Shell Bldg., St. Louis, Mo., Lorenz G. Straub, Minneapolis, Minn., and Niels Thompson, 2403 Tower Dr., Austin, Tex., consult. engrs.

Tex., Houston—Gulfton Utilities, Inc., c/o J. A. Nix, 5126 Portsmouth St., elev. water mains, for 100 acre sub-division; $35,000; elevated and ground storage tanks, water supply well, pumping unit, $70,000. Heise & Wise, 619 San Jacinto St., consult. engrs.

Tex., Houston—Houston Private Homes Corp., c/o Preston R. Plumb, 4550 Griggs Rd., WW, $1,000 acre tracts at Ralston and Garrett Rds., $100,000. Robert M. Atkinson, 1st. Natl. Bank Bldg., consult. engr.

Tex., Rotan and Roby—Fisher Co. Water Control Improv. Dist., Rotan, bond election Aug. 29, 10-in. C.I. water mains from Sweetwater to towns Rotan and Roby, $750,000. Extended date. CD 6/29 under Towns of Rotan and Roby, Rotan.

Tex., San Antonio—City Water Board, 106 W. Market St., R. E. Hughes, mgr., 16-in. main from Woodlawn Ave. to Hillcrest and Main Drives, $30,000; 24 in. C.I. main Artesia Pumping Station to E. Commerce St., $30,000; 16 in. C.I. main from E. Commerce and Rio Grande Sts. to Hicks Ave. with 12 in. main to connect with tank on Vanderbilt, with booster pumping station, $70,000; supply artesian well in Concepcion Park, $30,000; water supply well near McCullough Ave. and Comal Park and 12 in. main to Basse Rd., $75,000; water supply well and pumping stations at Hillcrest and Brackenridge Drives, $45,000; laying approx. 74,640 lin. ft. water mains to connect with newly developed areas, $129,895; 1 m. gal. elevated steel tank and tower on Vance Jackson Rd., $145,000; water supply well, Fance Jackson and Fredericksburg Rds., $40,000. CD 1/19.

Utah, South Ogden—Town, c/o Lee H. Stauffer, recorder, voted $100,000 bonds, drilling a culinary water well and constr. water supply main, Wm Templeton, Dooly Bldg., Salt Lake City, consult. engr.

Wash., Cosmopolis—City, City Hall, water sys., $125,000. Alaska, Wrangell—City, City Hall, water sys., $325,000. A. Erickson, Ketchikan, consult. engr. CD 7/11.

Alta., Edmonton—City, trunk water mains, Strathcona district mains. Approx. $257,000; Calder line $215,000. CD 7/27.

Que., Cap St. Ignace—Municipality, waterworks, $230,000. G. C. Piette, 14 Place d'Assomption St., Quebec City, engr.

SEWERS, WASTE DISPOSAL

Calif., Los Angeles—Bd. Supervs., Los Angeles Co., 501 Hall of Records, sanitary sewers in Adella Ave., C. I. 1946, El Monte; $107,900. C. E. Arnold, co. engr.

Calif., Salinas—Clisal Sanitary Dist., Salinas, $500,000 defeated bonds sewage improvs. CD 4/29.

Ill., Joliet—State, Springfield, sewer sys. to improv. service facilities at Illinois State Penitentiary incl. separate disposal plant, $270,000. C. Herrick Hamilton, Springfield, state archt. CD 3/11/46.

Ill., Kankakee—City, City Hall, sewage treatment works alterns., $125,000. Warren & Van Praag, 253 Park St., Decatur, consult. engrs. CD 4/19/48.

▲ Ill., Ottawa—City, sewerage proj., $2,000,000.

Ind., Sellersburg—Bd. Trustees of Sellersburg, sanitary sewers, pumping station and sewage treatment plant addns. and extensions, $200,000. R. E. Schenck, 1532 N. Meridian St., Indianapolis, consult. engr.

Ia., Garnavillo—City, sewer sys., $129,727.

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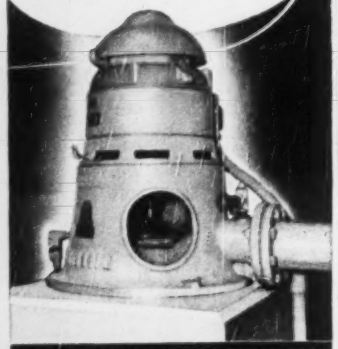

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Kan., Wamego—City, sewage plant $125,000.

Ky., Somerset—City, imprv. sewage sys., lift station, remodeling sewage disposal plant. $275,327.

Minn., Marshall—City, H. S. Harmon, sewage treatment plant, $200,000. Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, consult. engrs.

Minn., Northfield—City, J. Larson, clk., sewage treatment plant, $150,000. Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, consult. engrs.

N. Y., Cornwall—Dpt. Pub. Wks., Albany, sewers and treatment plant. $200,000.

N. C., Asheville—City, John C. Walker, city engr., sewer mains, 51,600 lin. ft. new intercepting sewers; 20,000 ft. main repairs. Approx. $800,000.

▲ N. C., Charlotte—City, H. A. Yancey, city mgr., City Hall, voted bonds July 29, enlarging and expand sewer sys., $2,000,000. CD 7/5.

Okla., Lawton—City, Lawton, voted bonds, sewage disposal plant, $600,000; storm sewers, $400,000; sanitary sewer extens., $290,000. Charles Gallager, c/o owner, engr. CD 6/22 and 5/23.

Okla., Norman—City, Norman, bond election Aug. 26, storm sewers $450,000. V. V. Long & Co., Colcord Bldg., Oklahoma City, consult. engr.

Pa., Graterford—General State Auth., 18 and Herr Sts., Harrisburg, imprvs. sewer sys. and water lines at Eastern State Penitentiary, Graterford Branch, incl. installing settling tanks and filters, etc., $280,000. A. F. Jones, c/o owners, ch. engr.

Tex., Denison—City, Denison, defeated bonds, 1½ m. gal. sewage treatment plant, $200,000; interceptor sewer line across town to new disposal plant, $172,000. E. C. Ewards, city engr.

Tex., Houston—Griffin Utilities, Inc., c/o J. A. Nix, 1416 Portsmouth St., sanitary sewer lines, 100 acre subdivision, $50,000; sewage disposal plant, $60,000. Howe & Wise, 419 San Jacinto St., consult. engrs.

Tex., Houston—C. E. King & Assoc., 2110 Dennis St., storm sewers, $80,000; sanitary sewer sys., $100,000; earthwork, site development, open drainage, $65,000, in 3,000 acre site for community to be known as Kingston. Kirby M. & Robert W. Atkinson, 1st Natl. Bank Bldg., consult. engrs. CD 4/10.

Tex., Houston—Houston Private Homes Corp., c/o Preston R. Plumb, 4550 Griggs Rd., storm sewers, drainage, $85,000; sanitary sewers, $150,000 in 1,00 acre tract at Walton and Garrett Rds. Robert M. Atkinson, 1st Natl. Bank Bldg., consult. engr.

Tex., Stephenville—City, Stephenville, voted not to build storm sewers, $50,000; sanitary sewers, $60,000. CD 7/18.

▲ Va., Richmond—City, City Hall, constr. sewage disposal facility, $14,000,000. Greeley & Hansen, 220 S. State St., Chicago, Ill., consult. engrs. CD 4/27/49.

Wash., Pasco—City, City Hall, sewage sys., west end section, $350,000.

Wis., Strum—Village—sewage treatment plant and sewers, $102,930. General Engrg. Co., Portage, consult. engr.

Ont., Galt—Municipality, sewerage disposal system $250,000. N. J. Greville, City Hall, city engr.

Ont., Paris—Municipality, sewage disposal sys., $200,000. R. M. Lee, Town Hall, town engr.

BRIDGES

▲ Neb., Bellevue—Bellevue Bridge Comm., Bellevue, bridge over Missouri River, over $1,000,000. Kirkham Engr. Co., 1500 Dodge, consult. engr.

▲ N. C., Charlotte—City, H. A. Yancey, city mgr., City Hall, voted bonds July 29, eliminating railroad grade separation, $1,500,000. CD 7/5.

Oklahoma—State Hy. Dpt., Oklahoma City.

Beaver Co.—replacing bridge over Cimarron River on U. S. 183, north of Rosston, $160,000.

Harper Co.—replacing bridge over Cimarron River on U. S. 64, north of Buffalo, $175,000. S. K. McClelland, Oklahoma City, state engr.

Tex., Corpus Christi—Southern Pacific R.R. Co., E. E. Mayo, ch. engr., 65 Market St., San Francisco, Calif., reconstr. 600 lin. ft. burned out portion of railway bridge across Nueces Bay, $100,000.

Tex., Rio Grande City—Gus Guerra & Assoc., Rio Grande City, revising plans, toll vehicle and pedestrian bridge across Rio Grande River, $200,000. J. W. Beretta Engr., Milam Bldg., San Antonio, engrs. CD 1/27.

▲ W. Va., Dunbar—City, Dunbar, bridge, $1,619,040. C. P. Fortney, Union Bldg., Charleston, consult. engr.

Ont., Toronto—City, H. E. McCallum, mayor, replacing bridge on South Glen Dr. over Rosedale Ravine, $800,000, and replacing subway $500,000. M. A. Stewart, c/o owner, engr.

STREETS AND ROADS

Calif., Los Angeles—City Bd. P. Wks., City Hall, 4 wide, straighten Glendale Blvd. from Main St. to Los Angeles River, $322,400. Lloyd Aldrich, city engr. CD 11/15/45.

Ill., Macomb—City, paving 2 blocks, Pearl Str. Approx. $127,000.

▲ Ill., LaSalle—LaSalle Co., LaSalle, bond election Nov. 7, general road improv. program, county wide, $2,500,000. George L. Farnsworth, County Supt. of Hys., LaSalle, engr.

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N. C., Asheboro—Town, J. F. McCrary, Asheboro, street imprvs., $140,000.
N. C., Charlotte—City, H. A. Yancey, city mgr., E. Trade St., voted bonds July 29, street imprvs., incl. sidewalks, gutters, draining, grading, etc. $500,000. CD 6/17/49.
Tex., Houston—Houston Private Homes Corp. c/o Preston R. Plumb, 4550 Griggs Rd., street constr. and paving, 3,000 acre tract at Ralston and Garrett Rds., near Kingston. $250,000. Robert M. Atkinson, 1st. Natl. Bank Bldg., consult. engr.
Tex., Houston—C. E. King & Assoc. 2110 Dennis St., street constr. and paving in 3,000 acre project for community to be known as Kingston. $100,000. Robert M. & Robert W. Atkinson, 1st Natl. Bank Bldg., consult. engrs. CD 4/10.
Tex., Houston—Suburban Homes Realty Co., c/o Lawrence O'Donnell, 9102 Humble Rd., street constr., paving, E. Houston Rd. $100,000. Edminister Engr. Co., 5410 Kirby Dr., consult. engr.
Wash., Seattle—City, County—City Bldg., Zone 4, paving alleys in Block 22, North Seattle addn. and other addns., $110,695. R. W. Finke, city engr.

EARTHWORK, WATERWAYS

† Washington—Bureau of Reclamation, Dpt. Interior, Boise, Idaho, diversion of water from Dungeness River with canal sys. to 2 regulating reservoirs, pipelines to 19,000-acre area, with 4 pumping plants, Squim, $4,800,000.

AIRPORTS

▲ Ill., Rockford—CAPITAL IMPRVS.—Greater Rockford Airport Auth., Rockford, plans by Foth, Porath & Horner Inc., 228 N. LaSalle St., Chicago, imprvs. and runways, aprons, taxiways, drainage projs., entrance roadways, lighting, sewerage, addn. T. hangars and administration bldg., imprvs. $1,191,899.
Alaska, Tok Junction—AIRPORT—Territorial Dpt. of Aviation, Juneau, airport on border 97 mi. from here, $100,000.

LATIN AMERICA

British Guiana, Georgetown—Government of British Guiana, Georgetown, plans rice processing factory, $1,000,000.
Mexico, Aguascalientes—Municipal Govt., Palacio Municipal, Aguascalientes, plans public works, streets, roads, public markets and schools, $450,000.
Mexico, Matamoros—Matamoros Gin Co., Matamoros, plans reconstruction of warehouses, $460,000; reconstruction of cotton gin plant, $500,000.
Mexico, Mexico City—A. de C. Del Valle F., Mayo Molier, exec. pres., Bucareli, 17, Mexico City, plans bicycle racing sports arena, $300,000.
Mexico, Mexico City—Industrial Cayera de Mexico, S. A., Mundo, 67-411, Mexico City, plans watch factory, $250,000.
Mexico, Nuevo Laredo—Mexican Federal Govt., c/o Dpt. Pub. Wks., Mexico City, plans irrigation proj. near Arroyo Del Coyote, $500,000.
Mexico, Nuevo Laredo—Mexican Federal Govt., c/o Dpt. of Pub. Wks., Mexico City, plans race track, $250,000.
Peru, Lima—Social Security Dpt. of the Ministry of Health of the Republic of Peru, Lima, plans by A. L. Aydelott of the architectural firm of Dent & Aydelott, 1st. Natl. Bank Bldg., Memphis, Tenn. and Edward D. Stone, 50 E. 69 St., New York, N. Y., U. S. A. hospital, $13,000,000.

PUBLIC BUILDINGS

Calif., Rodeo—SCHOOL—Rodeo Elementary School Dist., Rodeo, referred $572,000 bonds for 13 classroom school, $385,000, etc. CD 6/26/47.
Colo., Golden—COURTHOUSE—Bd. Co. Comrs., Jefferson Co., Court House, plans by Henry A. Koch, 406 Chamber of Commerce Bldg., Denver, 2 story, basmt., 100x60 ft., Court House, $500,000.
Del., Newark—SCHOOL ADDNS.—Bd. Educ., Newark, school addns., $400,000.
Ill., Galva—SCHOOLS—Community School Unit Dist. 224, Galva, plans by Raymond Orput, Empire Bldg., Rockford, voted bonds for 3 grade school, remodelling, expans. to high school, etc. $750,000.
Ia., Marshalltown—FEDERAL BUILDING—U. S. Eng., First and Douglas Sts. N.W., Washington 25, D. C., Federal Bldg., $625,000.
▲ Ia., Waterloo—SCHOOL—Bd. Educ., Waterloo, plans by M. H. Cleveland, Waterloo, junior high school, Approx. $1,000,000.
▲ Mass., Boston—HOUSING—City Housing Auth., 230 Congress St., plans by I. Richmond and C. Goldberg, 16 Arlington St., 3 story, brick, 150 unit Veterans Housing Proj., Pope's Hill Section, Dorchester, approx. $1,500,000.
Mass., Westwood—SCHOOL—Town School Dpt., High St., Plans by Harry J. Kirshund, 506 Washington St., Norwood, 1 story, 12 classroom elementary school, approx. $425,000.
Mass., Worcester—SCHOOL—City, City Hall, plans by L. W. Briggs Co., 90 Park Ave., elementary school, $700,000.
▲ Mich., Albion—HOUSING—Albion Housing Auth., 150 family unit housing, $1,500,000.
Minn., Bloomington, (Minneapolis P. O.)—SCHOOL—Bd. Educ., H. G. Dresser, supt., elementary school, 102 and Second Ave. S., $500,000.

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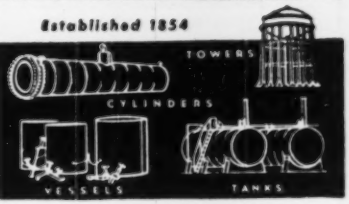

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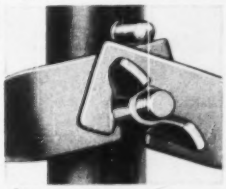

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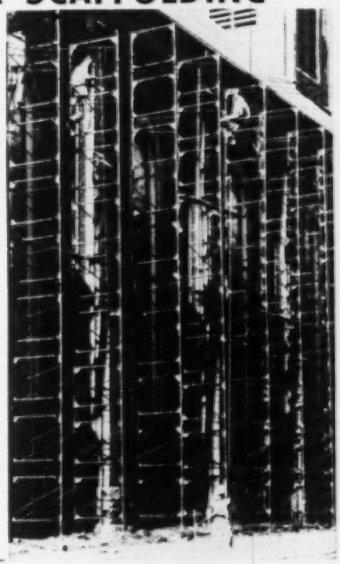

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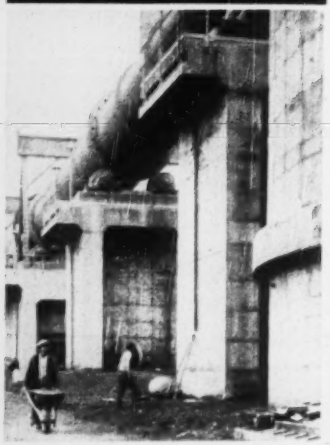

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▲ N. H., Manchester—HOUSING—City Housing Auth., Willow St., plans by John D. Bertley, 944 Elm St., Manchester, 200-unit housing project, South Elm St. Approx. $2,000,000. CD 1/27.

▲ N. Y., Port Chester—HOUSING—Port Chester Housing Auth., Town Hall, plans by Kahn & Jacobs, 2 Park Ave., New York, 126-unit low rental apartment development, on 3½ acre plot on Midland Ave. $1,000,000. CD 6/30.

N. C., Charlotte—HOSPITAL—Charlotte Memorial Hospital, 1400 Scott Ave., plans by W. Edwin Wilson, 1809 Plaza St., hospital wing. $420,000. CD 7/28/44.

O., Lorain—SCHOOL—Bd. Educ., Clearview Local School Dist., R. F. D. 7, Lorain, plans by Ward & Conrad, 412 Swetland Bldg., Cleveland, Clearview School. $400,000.

O., Milbury—SCHOOL—School Bd., Lake Twp., Wayne Center, c/o Milbury, bond election November 7, remodeling school, construct 2 story part tunnit, brick, tile high school. $800,000. Britsch & Munger, Nicholas Bldg., Toledo, archts. CD 11/28/45.

▲ O., Toledo—HIGH SCHOOL—Bd. Educ., Washington Twp. Local School Dist., Whitmer Dr., Zone 12, $1,500,000 bond election Nov. 7, junior high school. Bond election date extended. CD 7/20.

Pa., Bellevue—HOSPITAL ADDN.—Suburban General Hospital, 2 Jackson St., plans by Chas. & Edward Stotz, 801 Bessemer Bldg., Pittsburgh, 3-story, buttressbrick, concrete, steel-frame hospital addn. $400,000.

▲ Pa., Pittsburgh—HOUSING—Housing Auth. of Pittsburgh, City-County Bldg., plans by Marks Fisher & Simbolik, Oliver Wood Sts., and Mitchell & Richey, 524 4 Ave., 480-unit housing development. $1,000,000.

▲ Pa., Springfield—SCHOOL—Bd. Educ., Springfield, school. $1,000,000.

Tex., Amarillo—SCHOOL—Amarillo Independent School Dist., Amarillo, plans by Jones & Hooker, Johnson Bldg., 100x250 ft. brick, hollow-tile, Lamar Elementary school. $400,000. CD 4/15/47.

▲ Tex., Amarillo—HOSPITAL—Potter Co., Amarillo, plans by Ley-Callander, 414 Buchland St., 5 story Northwest Texas Hospital addn. $1,500,000. CD 9/5/47.

Tex., Hebbronville—SCHOOL—Jim Hogg County Independent School Dist., Hebbronville, plans by Hamon & Co., 715 N. Tancahua St., Corpus Christi, intermediary school. $350,000. School addn. and remodeling. $300,000. Frank H. Dolsaint, 117 W. Pecan St., San Antonio, consult. engr. CD 5/12.

Tex., Lubbock—SCHOOLS—Lubbock Independent School Distr., Lubbock, plans by Atcheson & Atkinson, Sanford Bldg., elementary school, N. E. of Experimental Station, $250,000; technical junior-senior high school, $950,000; elementary school, 34 and Toledo Ave., $250,000; plans by Butler-Brady, 1420 Ave. M., elementary school 42 and Elgin Ave., $250,000; plans by O. R. Walker, 303 Pat Theatre Bldg., elementary school 50 and Ave. Q, $250,000. CD 5/12.

▲ Tex., Odessa—BUILDING—Odessa College, Odessa, plans by Strange & Lisle, C/o Carter and Preston M. Green, N. P. Anderson Bldg., Fort Worth, masonry chemistry, No. 1, $325,000; masonry classroom bldg., $475,000; masonry science, $300,000; classroom bldg., $475,000; Dormitory No. 2, $325,000.

▲ Tex., Waco—HOUSING—Waco Housing Auth., Waco, plans by Wm. M. MacKenzie, P. O. Box 2511, 563 low-rent housing units. $4,125,000. CD 1/20.

▲ Wash., Seattle—DORMITORY—University of Washington, 15 Ave. NE. and 40 St., Zone 5, plans by Young & Richardson, Central Bldg., Seattle 4, Zone 4, dormitory to house 600 men. $2,250,000. CD 4/20.

W. Va., Bluefield—INDUSTRIAL ARTS—State Bd. Control, Charleston, industrial arts bldg. at Bluefield State College. $400,000.

▲ N. B., St. Stephen—HOSPITAL—Charlotte Co., St. Stephen, plans by Gowan-Ferguson & Associates, 515 Jarvis St., Toronto, Ont., 116 bed hospital. $1,150,000. CD 3/17/44.

Ont., London—SCHOOL—Separate School Bd., 416 Colborne St., plans by Charles Gillin, 284 Dundas St., London, high school at Colborne and Queens Aves., $500,000.

Ont., Palmerston—HOSPITAL ADDN.—Municipal Hospital Bd., Palmerston, plans by L. G. Bridgeman, Royal Bank Bldg., Toronto, 50 bed hospital addn. $480,000.

Que., Arvida—SCHOOL—School Comm., V. Mercier, secy., 20-classroom school. Approx. $400,000.

COMMERCIAL BUILDINGS

Ark., Hot Springs—BUILDING—Bd. Directors, Young Men's Christian Association, Servicemen's Center, Gaines & Cromwell, Gaus Bldg., Little Rock, building, $300,000 to $400,000.

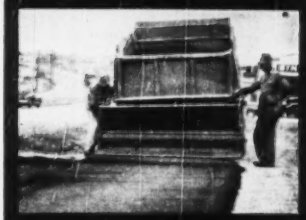
Ill., Chicago—HOUSING—Candlelight Corp., corner 51 and Sheridan Rd., plans by Homer A. Riesman, 53 E. Jackson Blvd., Zone 3, 2-story, remodel row housing. $400,000.

Ill., Chicago—HEADQUARTERS BLDG.—Catholic Order of Foresters, 101 W. Madison St., Zone 2, plans by Naess & Murphy, 360 E. Erie St., Zone 11, 4-story, brick, reinforced concrete brick stone headquarters bldg. $800,000.

Ill., Chicago—RESTAURANT, etc.—Fred Harvey System, 20 E. Jackson St., Zone 4, plans by Hasbrouck Root & Burgee, 230 S. Michigan Ave., 3 restaurants, 2 motel units, garage, etc., at 919 N. Michigan Ave., also bldg. $500,000.

▲ Ill., Lincoln—HOSPITAL—Memorial Hospital Assn., Keller & Foster, Lincoln, Neb., plans by Eckrel, Burt & Wetmore, 520 N. Michigan Ave.,

Grace chip spreader for seal and surface treatment. Operators platforms and trailing equipment standard equipment.



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Chicago and Deal, Deal & Trutter, Lincoln, Nebr., assoc. archt., 100-bed, brick, concrete Abraham Lincoln Memorial Hospital, $1,250,000. CD 11/28/48.

▲ Ky., Louisville—OFFICE—J. Graham Brown, Brown Hotel, 4 and Broadway Sts., plans by Preston J. Bradshaw & Assoc., 1900 Olive St., St. Louis, Mo., 26 story, 122x170 ft., structural steel, rein.con., Indiana Limestone office addn. $3,500,000. Neal J. Campbell, 911 Locust St., St. Louis, Mo., consult. engr.

Md., Baltimore—DWELLINGS—Uplands, Inc., 4625 Edmondson Ave., plans by Hal Miller, 2118 Maryland Ave., 1½ story, 55x26 ft., masonry & frame, ninety-three dwellings at 4200 block Banner Rd., 4200 and 4300 block Fairfax Rd., 4300, 4400, 4500 block Fairview Rd., 4500, 4600 blocks Norfolk Ave., 4400 block Wakefield Rd., 4000, 4100 block Westchester Rd., $558,000.

Md., College Park — CHURCH — University Methodist Church, University and Mowatt Lanes, plans by Ronald S. Senseman, 327 Carroll St., N.W. Washington, D. C., 1 story brick church and educational bldg. $430,000.

▲ Mich., Flint—HOSPITAL—Bd. Trustees Flint Osteopathic Hospital, 3 story, brick, steel hospital, $1,000,000.

Minn., Minneapolis—SHOPPING CENTER—Marl Investment Co., A. Bloom, pres., 32 Spruce Place, plans by Liebenberg & Kaplan, 51 S. 13 St., Lake Shopping Village, 265x780 ft. at Lake St. and Excelsior Blvd., $750,000.

▲ Pa., Erie—COLLEGE—Villa Maria College, 205 W. 9 St., plans by Walter T. Manchan, 406 Marine Bank Bldg., 3 story &mmt., irregular shape 150x140 ft., brick on block, steel frame college, $1,000,000. CD 10/23/47.

Tenn., Nashville—OFFICE—Mecklenburg Real Estate Co., Stahlman Bldg., remodeling Stahlman Bldg. $400,000-$500,000.

Tex., Fort Worth—DORMITORY—Texas Christian University, Fort Worth, boys dormitory completed. $400,000. Correction status. CD 5/24.

▲ Tex., Houston—HOUSING—Dixie Builders, c/o Carl Shirp, 2422 Wordsworth St., low cost frame Negro rental housing proj. off LaPorte Rd. $1,250,000.

Tex., Houston—DWELLINGS—Fairworth Co., Inc., c/o Malcolm McCollum, 2432 Notre Dame, plans by Edward Bader, 1240 Westheimer Ave., 1 story frame cedar shakes dwellings, Lamar Terrace. $750,000.

▲ Tex., Houston—HOMES—Houston Private Homes Corp., c/o Preston R. Plumb, 4550 Griggs Rd. plans by Paul Wolf, 2438 W. Alabama St., 1,000 frame low cost homes on 1,000 acre tract at Fairbanks and Garrett Rds. near Kingston. $13,000,000.

▲ Tex., Houston—APARTMENT—Krauss & Zarger, N. Shepherd Dr., 384 unit masonry, frame apartment, off N. Shepherd St. adjacent to Shepherd Gardens, $2,304,000.

▲ Tex., Houston—HOMES—Lawrence J. O'Donnell & Assoc., 9102 Humble Rd., 1,000 frame low cost homes, concrete post fdn., in Fontaine Pl. on Langley Rd. near Super Hy. 59 in North Houston. $4,500,000.

Tex., Houston—DWELLINGS—Prince Constr. Co., 5727 Kirby Dr., 64 attached frame dwellings, concrete slab fdn. resting units in area of Pine Terrace Addn. $475,000.

▲ Tex., Houston—HOMES—Suburban Homes Realty Co., c/o Lawrence J. O'Donnell, 9102 Humble Rd., 1,000 yellow pine, cedar shakes, frame homes, E. Houston Rd. $5,000,000.

Tex., Midland—CHURCH, AUDITORIUM—First Baptist Church, Midland, plans by Mark Lemmon, 1210½ Main St., Dallas, church and auditorium. $750,000. CD 3/24.

Tex., San Antonio—HOUSING—Mortgage Loan & Agency Co., c/o Gerald Meloff, First National Bank Bldg., housing proj., Hill Co. Estates. $400,000.

Wis., La Crosse—HOSPITAL ADDN.—Lutheran Hospital, 1410 South Ave., plans by Boyum, Schubert & Sorenson, Boetcher Bldg., La Crosse, 4 story &mmt., 141x147 ft. rein.con. brick hospital addn. $700,000.

▲ Alaska—APARTMENTS—Chris-Perg Inc. & Assocs., 2720 Westlake Ave., Seattle, Wash., plans by Adrian Wilson, 816 S. St., Los Angeles, Calif., 1 apartment house each at Anchorage and Fairbanks, each $1,000,000; 24-unit apartment house and general store at Curry, $400,000; apartment house at Healy, $400,000.

▲ Alaska, Anchorage—APARTMENT, etc.—Harry Lewis, Meyer Laurie and Melvin Laurie, 3447 4 Ave. S., Seattle, Wash., 30-unit Hollywood Block apartment, $3,000,000; Jefferson Court, Linda Court and Third Ave. apartments. Approx. $1,000,000 each; 500 homes at Goose Lake. $5,000,000. CD 1/16.

▲ Alta., Calgary—HOUSING—E. Edward Eckfeld, Edmonton, community housing proj. $1,500,000.

Ont., Ottawa—HOSPITAL ADDN.—Grey Nuns of the Cross, 26 Cambridge St., plans by R. Mortineau, 200 Bay St., 200-bed St. Vincent Hospital addn., Approx. $900,000. CD 4/26/49.

▲ Que., Montreal—COTTAGES—Victoria Constr. Co., 2300 Florian St., Montreal, fifty 1 story, &mmt., 35x40 ft. concrete brick cottages on Dufferin Rd., $1,500,000.

▲ Que., Montreal—INSTITUTE ADDN.—University of McGill, Sherbrooke St. W., plans by Fetherstonhaugh & Assocs., 901 Victoria Sq., neurological institute addn. $1,250,000.

Que., Quebec City—RECREATION CENTRE—Roman Catholic Parish of St. Roch, 158 St. Joseph St., Quebec City, plans by C. Anctil, 2 Provost St., Quebec City, 2 story, &mmt., rein.con. stone recreation centre on Fleurie St. $300,000.

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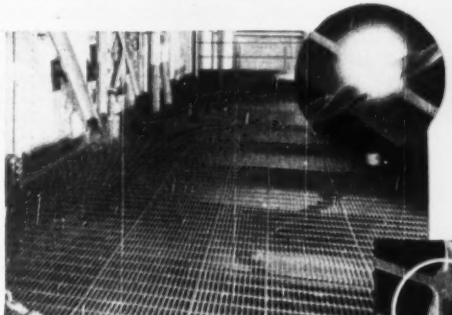

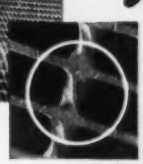

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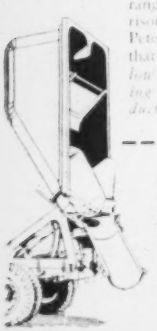

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INDUSTRIAL BUILDINGS

Ala., Bay Minette—PLANT—Baldwin Oil Mills, Inc., Bay Minette soybean processing plant, $300,000.

Ariz., Phoenix—PLANT—Carnation Co., 3104 N. Central Ave., plant, by Lescher & Mahoney, Title & Trust Bldg., Phoenix, milk and ice cream processing plant, $500,000.

▲ Colo., Colorado Springs—PLANT—The Nestle Co., Inc., 155 E. 44 St., New York, N. Y., plant and offices, on 16-acre tract, $1,000,000.

▲ Mich., Wayne—PLANT—Lincoln-Mercury Div., Ford Motor Co., 6200 W. Warren Ave., Detroit, Zone 32, approx. 1,000,000 sq. ft. new assembly plant on South Side of Michigan Ave.

Mo., North Kansas City—WAREHOUSE—Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, plans by Everett & Bleistein Assoc., R. A. Long Bldg., Kansas City, warehouse at 12 and Burlington Ave., $300,000.

▲ Mont., Silver Bow—PLANT—Victory Chemical Works, Bd. of Trade Bldg., Chicago, Ill., constr. electric furnace phosphate plant, $5,000,000.

N. Y., New York—GARAGE—Owner, c/o Harris, Newmark & Harris, 299 Broadway, plans by Gertler & Spindel, Rm. 804, Zone 7, 4 story 100x200 ft. parking garage, Seventh Ave. and 38 St., $600,000. CD 7-24.

Tex., Houston—PLANT—Gulf State Tomato Corp., 303 Louisiana St., plans by Zimmerman & Goble, 310 Lovett St., 90x420 ft., masonry, steel, tomato packing plant on 27 acre site at Homestead Rd. and N. Loop Hy., $650,000.

▲ Wash., Spokane—MILL—Kaiser Aluminum & Chemical Corp., Mead, to add a seventh potline at reduction plant, two structures each 504x741 ft., mill expansion, $2,000,000.

▲ Que., Dominiona—PLANT ADDNS.—Dominion Paper Co., Ltd., Donnacona, plant adns., $2,250,000.

UNCLASSIFIED

Ill., Rock Island—ARENA—Quad City Arena, Inc., Rock Island, 6,300 seat sports arena, $500,000.

Mich., Detroit—ICE SKATING RINK and FIELD HOUSE—City, Dist. Parks & Recreation, J. J. Considine, Supt., 1214 Griswold, 90x250 ft. concrete, brick ice skating rink, $250,000; two 40x60 ft. brick field house at 5 Mile and Shoemaker, and at Leigh and Herkimer, $65,000 each.

Mo., St. Louis—COMMUNICATION SYSTEM—St. Louis-San Francisco Railway Co., E. L. Anderson, asst. chf. engr., 1443 St. Louis Union Station, install communication system on underwaved yard, 65 ft. steel communication tower, five 110 ft. steel towers for floodlighting sys. etc., 40 ft. flood light tower, stop yard-master's roof.

New Mexico—RURAL DISTRIBUTION LINES—Continental Divide Electric Cooperative, Grants, 200 mi. 7.2/4.4 kv rural distr. lines, McKinley Co., $240,000. Southwest Engineers, 510 Transit Tower, San Antonio, Tex., consult. engrs.

North Carolina—TELEPHONE SYSTEM—Yadkin Valley Telephone Membership Corp., Yadkinville, voted $510,000 bond telephone system in Yadkin & Davie Counties, $599,000.

▲ Ohio—PIPE LINE—Essarco Corp., c/o Standard Oil Co. of Ohio, Midland Bldg., Cleveland O., and Shell Oil Co., 50 W. 50 St., New York 20, N. Y., 57 mi. 8 in. pipe line between Lima and Sorrnsfield, $1,300,000.

Pa., Mayview—ELECTRICAL DISTRIBUTION LINES—Commonwealth of Pennsylvania, State Auth., 18 and Herr St., Harrisburg, constr. steam and electric distr. lines, Mayview State Hospital, $624,000. A. P. Jones, c/o owner, engr.

▲ Texas, Louisiana and Mississippi—GAS PIPE LINE—Texas Gas Pipe Line Co., 1529 Fairfield St., Shreveport, La., 1,430 mi. natural gas pipe line, mostly 30 in., from Texas, Louisiana and Mississippi points converging in vicinity of Hattiesburg, Miss., $110,000,000. CD 12-17-48 and CD 4-5-49.

▲ Texas—RURAL DISTRIBUTION LINES—Nueces Electric Co-operative, Robstown, 200 mi. rural distr. lines, 74 mi. conversion to 2 and 3 phase lines, conversion to 24,000 volt, 1,131 mi. rural distr. lines, 12 distr. subs. to 24,000 volt, Nueces Co., $3,000,000. Jim Wells, Live Oak, Duval, Nueces and McMullen Counties, $640,000. Freeze & Nichols, 407 Dunciger Bldg., Fort Worth, consult. engrs.

Tex., Dallas—TRAFFIC SIGNAL SYSTEM—City, City Hall, Main and Harwood Sts., modernizing and revising communication and traffic signal system, $100,000. Wilbur M. Graff, city traffic engr.

Tex., Denton—STADIUM—North Texas State College, c/o Dr. W. W. McConnell, pres., Denton, plans by Wilson & Patterson, 212 Mummie Bldg., Fort Worth, reinforced concrete stadium, $450,000. CD 12-17-48.

Tex., Houston—RELOCATING RAILWAY—City, bond election Aug. 26, relocating railway lines, Main St. Turning Basin and Jacinto St. bridges, Turner & Skyrme, Shell Bldg., St. Louis, Mo., Lorenz G. Straub, Minneapolis, Minn., and J. Niles Thomson, 2403 Tower Dr., Austin, Tex., consult. engrs.

W. Va., Huntington—SWIMMING POOLS—City, c/o W. W. Payne, mayor, 2 swimming pools, $400,000.

B. C., Vancouver—GRAIN ELEVATOR—Harris Grain Co., Ltd., Toronto, Ont., grain elevator at foot of Bidwell Street, $500,000. Engineer: Northern Bldg., 423 West Block, Ottawa, Ont., consult. engr.

CONSTRUCTION REPORTS-Second Section

WATER SUPPLY

BIDS ASKED

N. C., Carthage—B.A. 8/22—Town, A. C. Barnes, mayor, Carthage, raw water supply main, pump station and treatment plant. Plans deposit $25. Barber, Keels & Assoc., Inc., 1307 Maron St., Columbia, S. C., engr. CD 4/24.

Miss., Brookhaven—B.A. 8/23—City, 2 elevated steel water storage tanks and towers. W. E. Johnson First Federal Savings & Loan Assoc. Bldg., Jackson engr.

Pa., Hollidaysburg—B.A. 8/23—General State Auth., 18 and Herr Sts., Harrisburg, water supply and distr. sys. at Hollidaysburg State Hospital. $160,000. Plans deposit $10. J. Murray Africa Co., 113 4 St., Huntington, engr. CD 9/30.

Ia., Burlington—B.A. 8/24—City, steel water tank, $75,000. Alvord, Burdick & Howson, 20 N. Wacker St., Chicago, Ill., engrs.

Wash., Bellingham—B.A. 8/24—City, City Hall, reservoir on Dakin St. T. P. Scholz, City Hall, city engr.

Tex., Fort Worth—Bids Asked—Taylor-Todd Corp., First National Bank Bldg., water sys., near Quartermaster Depot. $50,000.

Tex., Houston—Bids Asked—Carolina Gardens Development Co., Inc., 2401 Blodgett St., WW. $40,000.

LOW BIDDERS

Conn., Willimantic—City, City Hall, WW., addnl. facilities, concrete, from Preload Corp., 211 E. 37 St., New York, N. Y., $108,879; steel, from Seminole Constr. Co., Inc., East Hartford, $140,000.

Tex., Bay City—City, City Hall, Aug. 3, water lines sys., from J. B. Garrett Plumbing Co., 2343 S. Staples St., Corpus Christi, $143,335. Est. $150,000. CD 7/24.

CONTRACTS AWARDED

Calif., San Rafael—Marin Municipal Water Dist., 847 4 St., 24,000 lin. ft. 4 in. welded steel water pipe line from Bon Tempe Lake to Mill Valley (Southern Marin Proj. Contr. 2), to R. P. Van Valkenburg & Co., Box 1192, Sacramento. $101,112. Bids 8/1. CD 7/24.

Fla., Fort Walton—Town, WW. sys. addn., to Carter Constr. Co., Geneva, Ala., $127,111. Bids 7/25. CD 7/17.

Ga., Douglasville—Douglas Co., WW. improvs., to E. N. Murray & Co., Buena Vista, $154,437. Bids 7/11. CD 7/7.

Ind., Crown Point—City, City Hall, WW. addns., extens., etc., to J. M. Foster, 5701 W. 6 St., Gary, $150,000. Bids 7/18. Awarded 7/31. CD 6/29.

▲ Pa., Greensburg—Westmoreland Co. Municipal Auth., 233 S. Pennsylvania Ave., constr. rock fill overflow type dam with Wakefield wood piling core, incl. preparation reservoir site and constr. pump pit with rock screen for installing pump to be furnished by others, 125,000 lin. ft. 24- to 42-in. reinforced pressure pipe with rubber and steel joints, R. B. Smith Constr. Co., P.O. Box 20, Scottsdale. $1,101,487. Bids 9/24. CD 7/5.

Tex., Longview—City, City Hall, water distr. lines. Owner builds. $100,000. CD 6/9/48.

SEWERS, WASTE DISPOSAL

BIDS ASKED

Minn., Pipestone—B.A. 8/22—City, H. Gilmore, clk., street improv., 10,450 sq. yd. bit. surf., about 9,500 lin. ft. curb and gutter, incl. base excavate, grade, and storm sewers, appurtenances. $80,000. Plans deposit $15. Scott, Eng. Co., Watertown, S. D., engr.

N. Y., New York—B.A. 8/24—Bd. Water Supply, 120 Wall St., Contr. 324 and 326, Kensington, Inc., for testing and testing plumbing, gas fitting, heating and ventilating equipment, elevators, pumps, motors and pump stations at Port Jervis reservoir site, Port Jervis, Orange Co. Plans deposit $5. Eric ENR 8/17.

N. D., Oakes—B.A. 8/24—City, sewer. $60,000. G. J. Tonner, Mandan engr.

Tex., Fort Worth—Bids Asked—Taylor-Todd Corp., First National Bank Bldg., storm and sanitary sewers, near Quartermaster Depot. $119,000.

Tex., Houston—Bids Asked—Carolina Gardens Development Co., Inc., 2401 Blodgett St., sanitary sewer lines—disposal plant. $65,000; storm sewers, $50,000.

LOW BIDDERS

Calif., Oakland—City, City Hall, Aug. 1, sanitary sewers in Rock and Pine Knoll areas, etc., from Stuck, Box 8451, San Leandro. $147,746. CD 7/11.

Calif., San Francisco—Dist. P, Wat. City Hall, Aug. 2, sewage sys., sewerage sys., Sect. 2, Oakdale Ave., 2053 ft. from Chas. L. Harney, 525 Jerry St., $114,746. CD 7/21.

Mass., Weymouth—Sewer Dist., Weymouth, sewers in Pleasantview, East Weymouth, from Baker & S. P. Inc., 1475 Washington St., Jamaica Plain, $112,982.

Minn., St. Charles—City, D. N. Lindell, clk., rejected bids July 20, sewage treatment plant. L.B. $131,000. May readvertise. CD 7/28 under 1B.

Minn., St. Louis Park—Village, P. Justad, clk., July 31, sanitary sewers for Sanitary Sewer Dist. 216, about 14,602 lin. ft. pipe, from Phelps-Drake Co., 1415 Jackson St., Minneapolis, Alt. 1, $152,363; Alt. 2, $116,760. CD 7/13.

N. J., Camden—City c/o Purchasing Bd., July 19, bulkhead, fill, work and outfall sewer structure, from Progressive Builders, Inc., Pennsauken, $688,151. CD 6/29.

Tex., Fairfurrias—City, July 28, sanitary sewerage system, improv. extens., from Mitchell Darby Constr. Co., P. O. Box 369, McAllen, $119,594. Est. $100,000. CD 7/17.

CONTRACTS AWARDED

Tex., Houston—Houston Private Home Corp., c/o Preston R. Plumb, 4550 Griggs Rd., sanitary and storm sewers on 1,000 acre tract at Ralston and Garrett Rds., near Kingston. Owner builds. Approx. $125,000. CD 7/31.

Tex., Houston—Terry & Perry, 3705 Ella Lee Lane, sanitary and storm sewers. Owner builds, $108,000. CD 7/25.

Tex., Longview—City, sanitary sewers. Owner builds, $150,000. CD 6/9/48.

Wash., Bremerton—City, City Hall, Unit 1, 43,226 ft. 6- to 12-in. sanitary sewers, 93 manholes; Unit 2, 2,500 lin. ft. 12-in. storm sewers, 6 manholes and 8 inlets, and Unit 3, 2,500 lin. ft. 8-in. pressure sewers to Lent's Inc., Bremerton, $146,275. Est. $194,000. Bids 8/2. CD 7/20.

Ont., Ottawa—Central Mortgage & Housing Corp., 395 Fleet St. W., Toronto, sewers and water mains to service 500 housing units at R.C.A.F. station at Rockcliffe, to Lightfoot Brothers Constr. Co., 206 Main St., Picton. Approx. $175,000.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

August 25	August 30
Kentucky	California
Minnesota	August 31
North Dakota	California
Pennsylvania	September 6
August 29	Florida
Indiana	

New Jersey—B.A. 8/22—New Jersey Turnpike Auth., 65 Prospect St., Trenton, Zone B.

Essex Co.—Constr. 42, constr. substructures and superstructures of 10 viaducts at relocated Port St. and bridge carrying Route A of the Port St. Interchange over water incidental work, Newark. Plans deposit $5. Ammann & Whitney, 76 Ninth Ave., New York, 11, N. Y., engrs. CD 7/13/49.

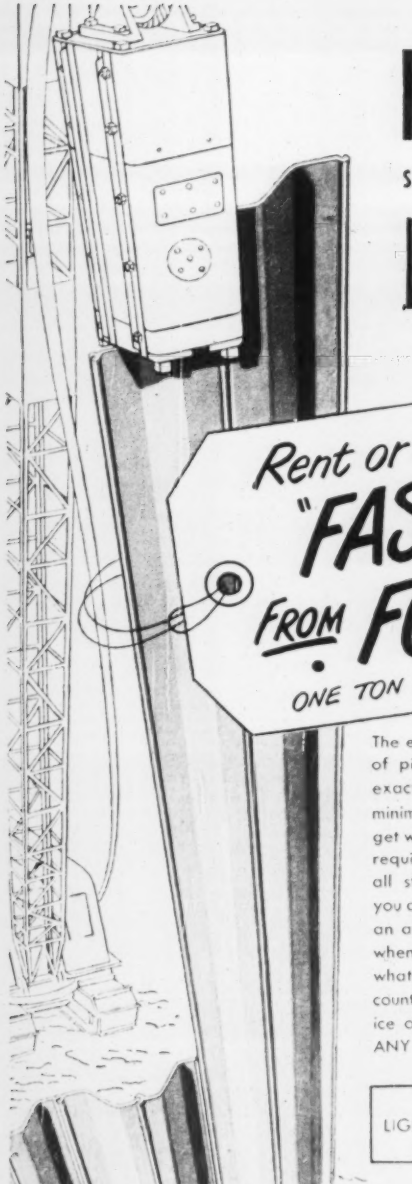
N. C., Raleigh—B.A. 8/30—Owner's office, North Carolina State College Campus, Raleigh, reinf. con. 3 span double track R. R. Bridge Seaboard Air Line and Southern R. R. and vehicular underpassing. Plans deposit $10. Mann & McGlohorn, Box 2248, Greensboro, consult. engrs. CD 6/1.

New Jersey and Pennsylvania—B. A. 8/31—Delaware River Joint Toll Bridge Comm., 426 Broad St. Bank Bldg., Trenton. B. N. J., constr. Delaware River Bridge from Morrisville, Pa., to Trenton, N. J. Plans deposit $50. J. E. Greiner Co., 3201 St. Paul St., Baltimore 2, Md., engr., adv. ENR 8/17. CD 2/4/49.

LOW BIDDERS

▲ Georgia—State Hy. Dept., Atlanta, grading, paving, misc. str., approaches, and bridge at Little River on Louisville-Augusta Rd., Proj. SA-9-(4), 2.3 miles in Lincoln County, from E. H. Hines Constr. Co., Sylvania, Ga., and Robert Lee, Inc., Manning, S. C., $1,411,941. CD 7/14.

Iowa—State Hy. Comm., Ames, Aug. 1, 65 reinforced concrete slab, steel plate girder, concrete substructure on Iowa 4 from Storm Lake west and south to end of pavement southeast of Delphi, Fred Crawford and Sac County, Proj. RS-4-(3)-Sac-Buena Vista-Sac-Crawford-Carroll-Buena Vista-Carroll-Crawford-Carroll-Buena Vista



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▲ New York—Dpt. P. Wks., Albany, separation of grades between Central Ave. in village of Lancaster and tracks of Erie, Delaware, Lackawanna and Western, Lehigh Valley and New York Central R.R. incl. 4 through plate girder structures, 0.63 mi. variable width c. conc. pavement. Erie Co., to Depew Paving Co., Inc., 4955 Broadway, Depew, $1,457,559. Est. $1,585,000. Bids 7/12, awarded 8/10. CD 7/14, under LB.

B. C., Quesnel—Pacific Great Eastern Ry., Parliament Bldgs., Victoria, superstructure for new Cotton Fever Bridge, Cottonwood River, to Dominion Bridge Co. Ltd., 2450 Boundary Rd., Burnaby, $560,000. Awarded 8/2. J. M. Stewart, Parliament Bldgs., Victoria, engr.

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

August 22
Wisconsin
August 25
Kentucky
Minnesota
North Dakota
Pennsylvania
Tennessee
August 29
Indiana
Maryland
August 30
California
August 31
California
September 6
Florida
Louisiana

† Arkansas—B.A. 8/31—Bureau Public Roads, Dpt. Commerce, P.O. Box 338, Albert Pike Sta., 115 Nevada St., Hot Springs.

Pope and Newton Counties—constr. 8.253 mi. Arkansas Forest Hy. Proj. No. B-7-A2, B, Part 1. Plans deposit $10.

† Tennessee—B.A. 9/1—Bureau Public Rds., Dpt., Commerce, First National Bank Bldg., Florence, Ala.

Wayne, Lawrence and Lewis Counties—constr. 7.794 mi. Proj. 1G1, Natchez Trace Parkway. Plans deposit $10.

LOW BIDDERS

California—State Div. Hys., Sacramento, Aug. 3, plant mix on untreated rock surf. 7.1 mi. between 2 mi. east of Los Angeles, Ventura Co. line, 1 mi. west of Moor Park Rd., Los Angeles Co., from Frederickson & Kasler, 212 14 St., Sacramento, $823,335; plant mix surf. 0.64 mi. incl. reinf. con. bridge in San Buenaventura State Park, Ventura Co., from C. J. B. Constr. Co., Box 329, Oxnard, $55,027. CD 7/11.

California—State Div. Hys., Sacramento, Aug. 2, imported surf. material on imported base material and applied bit., surf. tr. seal coat 3.6 mi. between Silver Lake and Alpine Co. line, Amador Co., from Harms Bros., 5261 Stockton Blvd., Sacramento, $226,035**; plant mix surf. 2.1 mi., portions hy. between Monument and Concord and widn. roadbed with imported base material crusher run base place plant mix surf. 3.2 mi., Byron Rd. between State Hy. Route 72 and 3.6 mi. southeast of Byron, Contra Costa Co., from J. R. Armstrong, 400 Central St., P. O. Box 216, El Cerrito, $107,099 and $89,238 respectively***; grading 4 mi., installing CM pipes in Willits, Ft. Bragg Rd. between 14 mi. and 10 mi. west of Willits, Mendocino Co., from John Burnam & Sons, 2750 Harrison Ave., Eureka, $89,580. CD 7/12.

Calif., Oakland—Joint Hy. Dist. 26 Courthouse, Aug. 4, grading, cement treated base and plant mix surf. 3.144 mi. incl. grading, paving connecting roads, constr. grade separation structure at Broadway Terrace and at Temescal Park Rdwy., drainage hy. lighting, signal sys. State Hy. Rte. 227 between 0.2 mi. north of Broadway Terrace and Brush Dr., from Fredrickson & Watson Constr. Co., 873 61 Ave., $819,128. CD 7/14.

Indiana—State Hy. Comn., Indianapolis, Aug. 3, bit. resurf. 19.64 mi. U.S. 41 and 52, Crawfordsville Hy. Dist., Benton and Tippecanoe Counties, from Rock Road Constr. Co., 5914 N. Rogers St., Chicago, Ill., $224,927 est. $225,970; bit. resurf. 9.67 mi. state Rds., 38 and 552, Crawfordsville Hy. Dist., Tippecanoe Co., from Fisher Constr. Co., 1707 Canal Rd., Lafayette, $57,305 est. $57,475. CD 7/25.

Iowa—State Hy. Comn., Ames, Aug. 1, pavement widn. resurf. 4.312 mi. U.S. 30 from point 4,970.7 ft. east of Benton Co. line east 4.331 mi., F-96 (12) Linn Co. and grading, incidental work 5.031 mi. U.S. 30 and Iowa 64 from Tama east to Iowa 212, F-276 (5) Tama Co., from Fred Carlson Co., Decorah, $206,693 and $267,218 respectively***; paving 0.876 mi. U.S. 61 in Muscatine from White to A-H St., U-87 (4), Muscatine Co., from Central Eng. Co., 2511 Rickingham Rd., Davenport, $150,497***; grading 4.949 mi. Iowa 13 and Iowa 64 north to S. mi. F-827 (3), Guthrie Co., from Wagner Johnston Co., Sioux City, $59,244***; grading 4.321 mi. U.S. 30 from point 970.7 ft. east of Benton Co. line east 4.331 mi. and F-96 (12) Linn Co., from R. A. Heintz, Inc., 249 1 Dr. S.E., Cedar Rapids, $64,939***; grading 5.031 mi. U.S. 30 and Iowa 64 from Tama east to Iowa 212, F-276 (4) from Condon-Cunningham Co., 4229 Lafayette St., Omaha, Neb., $120,355. CD 7/21.

Louisiana—State Dpt. Hys., Baton Rouge, July 26, soil cement or aggregate type base course, bit. surf., etc. 11.884 mi. Donaldsonville-Hymel Hy., S. Proj. 63-10-15 and 03-09-20, F.A.S. Proj. 5-112 (2), Ascension and St. James Parishes, from W. A. Patterson & Co., Box 2229, Baton Rouge, $366,712; grading 4.948 mi. incl. rein. con. deck girder timber bridges, drainage structures, etc. Kaplan-Crowley Hy., State Rte. 26, S.P. 57-03-08, F.A.S. 5.145 (1), Vermilion and Acadia Parishes, from T. L. James & Co., Inc., Ruston, $776,881. CD 6/29.

Maryland—State Rds. Comm., Baltimore, Aug. 1, relocation, grading, drainage, base, surface treatment to existing road, 6 conc. and single span steel I-beam bridge on concrete abutments over Tuscarora Creek, U.S. Rte. 15, Contr. F 330-1-455, Frederick Co., from L. K. Comstock & Sons, Inc., Thurmont, $143,333 alternate. $143,866 alternate. CD 7-11.

Michigan—State Hy. Comm., Lansing, Aug. 3, bs 6930, 2.161 mi. grade, drain, 2.0 Goddard Rd. north to Detroit Industrial Expressway, M 12-27, C13, Wayne Co., from Cokes Contg. Co., 1116 Penobscot Bldg., Detroit, $106,958; bs conc. 2.408 mi. Rte. M-153 from U.S. 24 west, Wayne Co., from Central Asphalt Pavers Co., 12490 Evergreen St., Detroit, $91,578.

Montana—State Rds. Comm., Helena, rejected bids Aug. 4, grade, grav., drain 10.027 mi. and gravel, drain, road mix, surf. 3.621 mi., Malta-Loring Rd., L. B., $219,464. Orig. reported at CD 7-27.

▲ New Jersey—New Jersey Turnpike Auth., Trenton, Aug. 1, Contr. 50, substructure and superstructure of N. Y. Susquehanna & Western R. R. and N. Y. Central R. R. overpass, etc., Ridgefield, Bergen Co., from Stark Constr. Corp., Grand Central Terminal, New York, N. Y., low of seven bids, $2,625,239; N. J. cast-in-place steel, $2,441,439; N. J. cast-in-place steel, $1,970,630; N. J. cast, $1,843,480; Contr. 44, superstructures, 19 bridges and 1 conc. viaduct to be placed upon abutments and piers which will be constructed under Contr. 31, 32 and 39, and other incidental work in connection with streets, turnpike between relocated Bayway Ave. and relocated Humboldt Ave., Union Co., from Tourner & McLane, 33 W. 42 St., New York, N. Y., $4,068,675. CD 7-19.

▲ New Jersey—New Jersey Turnpike Auth., Trenton, Aug. 8, Contr. 40, grading, drainage pavement and interchange Structure 1 at Rt. 46, removal existing bridge and new steel stream crossing Structure No. 2 at Salem Canal, underpass Structure No. 5 at Salem Co. Route 16 and incidental work in connection with contr., N. J. Turnpike Sect. 1, at Deepwater, Salem Co., from S. L. Groves & Sons Co., State Hy. 35, Woodbridge, $1,179,971. CD 7-26.

North Carolina—State Hy. & P. Wks. Comm., Raleigh, rejected bids July 25, grading, sub-grade reinf. S.A. surf. course 9.8 mi., Proj. 2-9.26-205, Washington Co., L. B., $138,886. CD 7-28, under LB.

Tex., Houston—City, City Hall, 900 Brazos St., Aug. 2, asph. paving San Jacinto St., from McGowen to Rusk St., from Russ Mitchell, Inc., Old Spanish Trail Rd., $206,057. CD 7/31/46.

CONTRACTS AWARDED

Ark., Brinkley—St. Improv. Dist. 2, Brinkley, paving 8 streets, to Central Arkansas Constr. Co., Benton, $146,093. Bids 7-27. CD 7-18.

Kansas—State Hy. Comm., Concordia, c. conc. paving 0.566 mi. beginning at north city limits of Troy, westerly on U.S. 36 in Troy, and 2.651 mi. beginning at north city limits of Troy, easterly on U.S. 36, Proj. 36-11 F 116-71, Parts 1 and 11, Doniphan Co., to Stannard Constr. Co., P. O. Box 2059, Wichita, $60,652 and $178,334 respectively; c. conc. pavement and detour 6.227 mi. beginning near intersection Elba St. and U.S. 406, approx. ½ mi. east of Emporia, northeasterly and east on new location of U.S. 406, Proj. 406-56 FI 618-1K, Lyon Co., to Kaw Constr. Co., Pauline, $354,750. Grand total $533,736. Bids 7-21. CD 7-10.

Mich., Allen Park—Village, 21,000 lin. ft. c. conc. pavement, to Verna Constr. Co., 15550 Goddard St., Wyandotte, $309,200. L. N. Hayden, 705 Lawyers Bldg., Detroit, engr.

▲ Montana—State Rds. Comm., Helena, grav., bit. surf. 16.93 mi. Grassrange east section of Grassrange-Jordon Rd. and Musty west section of same rd., Petroleum and Fergus Counties, to A. and W. Constr. Co., Havre, and Hamilton Constr. Co., Glasgow, $284,497. grav. road-mix oil C. conc. paving and constr. conc. and steel underpass Malta-Vandalia Hy., Phillips Co., to Roy L. Bair, West 1220 Ide Ave., Spokane, Wash., $257,505. grav., bit. surf. 4.85 mi. Red Lodge-Belfry Rd., Carbon Co., to Heald & Chrysler, Lolo, Mont., $199,543. grav. bit. surf. 15.63 mi. Plentywood-Canada Rd., Sheridan Co., to Albert Lalonde, Sidney, $130,383. grav., bit. surf. 9.82 mi. Arrow Creek-Brooks Rd., Fergus Co., to Sloan Arkwright, 1223 Sixth Ave. N., Billings, $74,926. grav. 2.82 mi., build 100-ft. timber bridge on Bonner-Gamble Rd., Powell Co., to Hiland Co., Missoula, $72,186. Grand total $1,019,040. CD 7-27.

▲ New Jersey—New Jersey Turnpike Auth., Trenton, Contr. 19, furnishing, placing, compacting various graded borrow, excv. materials in embankments, stabilizing existing ground by use of vertical sand drains, excavation, backfilling and compacting for foundations, underdrains and other incidental work on turnpike between CRR viaduct in Elizabeth to CRR viaduct in Newark, Elizabeth and Newark, Union and Essex Counties, to Construction Aggregates Corp., 1 E. 42 St., New York, N. Y., and Peter Kiewit Sons' Co., Omaha National Bank Bldg., Omaha, Neb., $5,034,373. Bids 7-6, awarded 7-26. CD 7-10, under LB.

▲ New York—Dept. Pub. Wks., Albany, contr. item 23, 11 concrete arches, separated by a total of 18 in., on Mohawk Thruway, extend from Onondaga Co. line east, west to Route 13, near Canastota, incl. necessary grading, drainage, 2 concrete bridges and grade separation structure, Madison Co., to The Lane Construction Corp., 37 Cody St., Meriden, Conn., $1,945,504. Est. $2,350,000. Bids 7-12, awarded 8-10. CD 7-14, under LB.

▲ Pennsylvania—State Dept. Hys., Harrisburg, Union, pavement 31 ft. width incl. 5 ft. inside shoulders, and reinforced bridge 25,500 ft., LR 229, 230, T. R. U. S.

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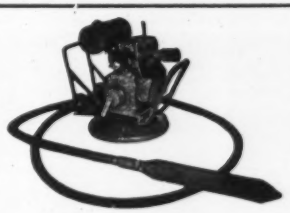

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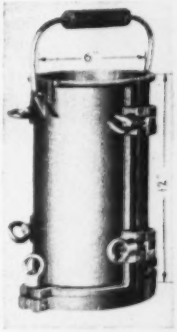

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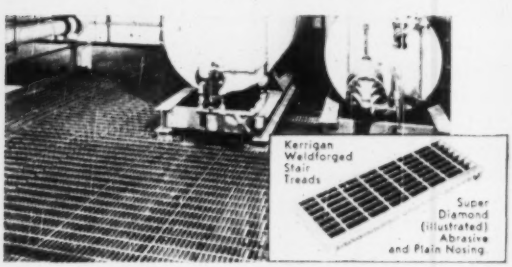

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11-15, from McKees Half Falls to point north of Fort Trevorton. Snyder Co., to Malvin Schaller & Edward A. Huffmaster, Fairmont, Schuylkill Haven, $1,176,305. Bids 7/28, awarded 8/7. CD 8/1, under LB.

Tex., Houston—Houston Private Homes Corp., c/o Preston R. Plumb, 4550 Griggs Rd., constr. asph. type paving streets, near Kingston. Owner builds. Approx. $125,000. CD 7/31.

Tex., Kilgore—City, impvts. streets, incl. paving. Owner builds. $125,000. A. P. Noyes, Kilgore, engr.

Tex., Waco—McLennan Co., Court House, asph. road paving, impvts., Roda Road Dist. 1, force account, $125,000. E. Martin, Court House, co. engr.

Washington—State Hy. Comm., Olympia, light bit. surf. and non-skid single seal on 42.62 mi, Primary State Hys. 6, 3 and 18, to Wolfred Whitman, Spokane, Pend Oreille and Stevens Counties, to N. G. Johanson, E. 1828 Trent St., Spokane, $74,189; surf. type 1-1 b., conc. paving, 4.781 mi, State Hy. 1-Y and 1, Stanwood vicinity and Marysville north, Island and Snohomish Counties, to Associated Sand & Gravel Co., Everett, $141,345. CD 7/20.

▲ Wyoming—State Hy. Comm., Cheyenne, grading, 9.132 mi, Woods Landing-Jelm Rd., Proj. S-76 (2), Albany Co., and base course surf., 5.912 mi, incl. 2 T. T. bridges, 4 rein.-con. culverts, etc. Aladin Rd., Hulett, Crook Co., to England & Roth Constr. Co., Rapid City, S. D., $93,539, est. $115,054 and $157,540, est. $188,785, respectively; base course surf., 5.295 mi, incl. 2 rein.-con. culverts, etc. Robertson Rd., Mountainview, Proj. S-264 (2), Uinta Co., to Huntley Constr. Co., Rocksprings, $100,115, est. $104,282; base course surf., 9.839 mi, incl. 4 rein.-con. culverts, etc. Sage Creek Rd., Rawlings, Proj. S-75 (2) and Proj. 2818 combination, Carbon Co., to Lichty Constr. Co., Riverton, $162,713, est. $178,283; grading 5.166 mi, incl. 1 rein.-con. culvert, ten 23 ft. T. T. span bridges over Poinson Creek, three 100 ft. span welded girder bridge over Wind River, Riverton Rd., Shoshoni, Proj. F-87 (5), Fremont Co., to J. H. & N. M. Monaghan & Assoc., Rte. 1, Derby, Colo., road $617,460, est. $371,159, bridges $168,262, est. $174,645. Grand total $1,299,629. Bids 8/4. Awarded 8/4.

EARTHWORK, WATERWAYS

BIDS ASKED

Ark., Helena—B.A. 8/22—White River Drainage Dist., 410 Solomon Bldg., 267,000 cu. yd. excav. and 225 acres clearing canals in district. Plans deposit $10. E. G. Green, 410 Solomon Bldg., engr. CD 10/28.

† Illinois—B. A. 8/24—U. S. Eng., 808 U. S. Court House and Custom House, St. Louis, 1, Mo., stockpiling material and constr. levees, Desoguin and Fountain Bluff Levee and Drainage Dists., along left bank of Mississippi River in vicinity of Brunkhorst Landing, Jackson Co., Proj. Item III-D, CIVENG 23-069-51-6.

LOW BIDDERS

† Nebraska and Missouri—U. S. Eng., 1709 Jackson St., Omaha, Zone 2, July 26, constructing strengthening, involving 5,695 cu. yds. of dikes on or immediately adjacent to Missouri River in Landon-Upper Hermosa Bends, Atchison and Holt Counties, Mo., and Nemaha and Richardson Counties, Neb., CIVENG 25-066-51-1, from Bultgren, Bowers & Peters, Clayton, Mo., $193,945. CD 7/5.

† Washington—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Bldg. 1-A, Denver, Colo., Aug. 1, earthwork, concrete lined pipe, pipe lined conduit, pipe laterals, irrigation blocks 70 and 701, for laterals and sub laterals, main canal, east low and west canal laterals, Columbia, Spec. 3101, from Collins Concrete & Steel Pipe Co., 841 W. Columbia Blvd., Portland, Ore., $421,712. Est. $345,386. CD 7/12.

CONTRACTS AWARDED

† Missouri—U. S. Eng., 601 Davidson Bldg., Kansas City, 6, Mo., 21¼ mi. agricultural levee, east bank Missouri River, 8 mi. north of Parkville, to Charles Holme Constr. Co., Grand Bend, Kan., $384,364. Awarded 8/3. CD 6/1/44.

Mo., Kirksville—City, J. W. Marsham, mayor, Raymond C. Waddell, clk., impounding dam, spillway channel and spillway, intake tower and intake tunnel for Big Creek Impounding Reservoir, approx. 4 mi. southwest of here, 5 acres clearing and grubbing for dam, etc., to R. G. Ainsworth, 1604 Nebraska Ave., Kansas City, Mo., $316,391. Est. $531,000. Bids 7/26. CD 7/17.

Montana—State Water Conservation Bd., Helena, earthfill dam on Frenchman Creek near Saco in Valley Co. to provide water for irrigating 8,000 acres in Valley and Phillips Counties, to Long Constr. Co., Treasure State Bldg., Billings, $121,568. Bids 8/3. CD 7/28.

AIRPORTS

BIDS ASKED

Pa., Phila.—DRAINAGE PIPES, etc.—B. A. 8/29—Dpt. P. Wm. T. Buckley, dir., City Hall Annex, Schedule A, installing drainage pipes, appurtenances for First Stage Apron and field expansion for grading, paving runway extension, taxiways, portion of apron and adjacent areas. Cont. No. A 181 SW. Philadelphia International Airport; adv. ENR 8/17. CD 2/19/46.

LOW BIDDERS

Calif., San Jose—AIRPORT—City, City Hall, July 31, San Jose Municipal Airport from Leo F. Piazza, 175 S. Montgomery St., $168,473. CD 7/18.

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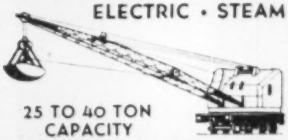

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† Fla., Cocoa—ROADS—U. S. Eng., 575 Rivertide Ave., Jacksonville. Zone 1: conc. resurfacing area, Local Roads Project Control No. 0-8-123-1, Range Projects Control No. 0-8-123-2, Brevard County; U. S. Eng., Jacksonville, Corps of Engrs., 1746 E. Adams St., Jacksonville. $254,929. Est. $228,653. CD 7-18.

Ind., Fort Wayne—AIRPORT TERMINAL—Bd. Aviation Comrs., City Hall, Fort Wayne. A. I. general contract, Baer Field Airport Terminal, from Hagerman Constr. Co., 402 E. Superior St., $294,000. CD 7-7.

PUBLIC BUILDINGS

BIDS ASKED

N. Y., Watertown—HOUSING—B.A. 8-22—Watertown Municipal Housing Auth., general contract, plumbing, heating and ventilating and electrical work for 96 family garden apartments, $750,000. Extended date for report, Webster, Crenshaw & Foley, Watertown National Bldg., Utica. CD 7-7.

Md., Salisbury—HOSPITAL—B.A. 8-23—Peninsula General Hospital, Salisbury, 150-bed, three-story, brick, stone steel and concrete frame hospital, general contract, about $900,000. James R. Edmunds, Jr., 130 W. Hamilton St., Baltimore, archt., Alexander E. Forrest, 518 Calvert St., Baltimore engr. CD 7-21.

▲ N. Y., Elmont—SCHOOL—B.A. 8-24—Bd. Educ., Union Free School Dist. 16, Belmont Blvd., School, Belmont Blvd., Contr. 1, general contract; Contr. 2, heating and ventilating; Contr. 3, plumbing and sanitary; Contr. 4, electrical work, elementary school, Nassau, Brooklyn, and Elmont Rd., $1,425,000. Plans deposit $40 for general, $25 for each of others. Frederick P. Anderson, 240 Rockaway Ave., Valley Stream, archt.

Va., Warrenton—SCHOOL—B.A. 8-24—City, High school, 8-rm. addition, $55. Smedley & Boynton, 112 E. 25th St., Norfolk, archts.

† Wyoming—POST OFFICE—B.A. 8-24—Bureau, Region 6, Kansas City, Mo., Custer County Homes Sub (Post Office), Spec. $195.

Miss., Marshall—SCHOOL—B.A. 8-24—Bd. Educ., M. J. Cochran, Jr., supt., $500,000. Plans deposit $15. Platt & Hickey, Memphis, archts.

N. C., Trenton—SCHOOL—B.A. 8-25—Jones Co. Bd. Educ., Court House, New Bern, Contr. 1, general contract, Court House, 2 high schools and Pollocksville elementary school, 1 high school here. Plans deposit $25, $10 each contract. Rowland & Kinston, archts.

Va., Richmond—SCHOOL—B.A. 8-28—At Office, City School Bd., 512 N. 5th St., Spencer Davis, School for Negroes, addition and alterations, $526,000. Plans deposit $20. Dean & Norman, 1214 E. Main St., archts.

▲ N. S., Sydney—HOSPITAL—B.A. 8-28—H. R. MacKeen, Provincial Secretary, Sydney Hospital Comm., City Hall, 6-story, 250-bed, reinforced concrete hospital, Contr. 1, general contract, $2,250,000. Contr. 2, heating and ventilating, $250,000. Contr. 3, plumbing, $250,000. Contr. 4, electrical work, $250,000. Plans deposit $25 each. Fowler, Kaiser & Fowler, Toronto, archts. CD 4-12-50.

Calif., Lindsay—SCHOOL—B.A. 8-29—Lindsay City Unified School Dist., 250 N. Harvard Ave., 12 classroom, multi-purpose, cafeteria, administration building, Jefferson Elementary School, Arthur Ave., $250,000. Plans deposit $20. Plans Wyman, Bonelli & Bolt, Bakersfield, archts. CD 11-2-49.

Calif., Long Beach—OFFICE—B.A. 8-29—State Bd. of Equalization, 2, W. Edg. Bldg., Sacramento, 2 story, 28,500 sq. ft. Contr. Dept. Engineering and Investigation, Sacramento. $25. Anson Boyd, Los Angeles, state archt.

Calif., Yountville—VOCATIONAL TRAINING CENTER—B.A. 8-29—State Dir. Vets. Affairs, Bldg., Sacramento, 49,600 sq. ft., vocational training center, veterans' home, Units 1 and 2. Plans deposit $25. Anson Boyd, Los Angeles, state archt.

▲ Neb., Beatrice—SCHOOL—B.A. 8-29—Bd. Educ., 3 high schools, $1,000,000. J. W. Koontmay, 2401 Fairfax Trafficway, Kansas City, Kan., archt.

▲ N. Y., Amityville—SCHOOL—B.A. 8-29—Bd. Educ., School Dist. 6, High School Bldg., Fire Ave., Contr. 1, general work; Contr. 2, heating and ventilating; Contr. 3, plumbing; Contr. 4, electrical work for Amityville Memorial High School, Merrick Rd., east of Broadway, $2,221,000. Plans deposit $40, refund. Ketchum & Konkel, 220 E. 42nd St., New York, archts.

▲ Calif., San Anselmo—SCHOOL—B.A. 8-31—Tamalpais Union High School Dist., Bd. 2, Box 30, Mill Valley, Dist. Finance Dept., high school, two 1-story, steel and concrete, classroom buildings, one 1-story, steel and concrete, gymnasium building, and swimming pool, $1,365,000. Plans deposit $25. Kump & Faire, 220 Montgomery St., San Francisco, archts. CD 5-1-47.

† Wash., Wallula—HOUSES—B.A. 8-31—Bureau of Reclamation, Region 1, Regional Director, Box 937, Boise, Ida., 2 houses, one 4-rm. and one 5-rm., Wallula Project, Columbia Basin Project, Wash. Plans and specifications may be seen at Bureau of Reclamation, Ephrata, Wash. Bureau of Reclamation, Boise, Ida., or Bureau of Reclamation, Washington, D. C. CD 5-31-50.

Del., New Castle—SCHOOL—B.A. 8-31—Bd. Educ., New Castle County Vocational-Technical School Dist., New Castle, 2-story, $950,000. Plans deposit $50. Frank Wilmington, archt. CD 7-21.

Tex., San Antonio—COMPRESSOR—Bids asked—City, Municipal Compressor, W. W. Tracy City Hall, engr.

LOW BIDDERS

▲ Colo., Denver—HOUSING—City of Denver Housing Authority, Bd. of Commrs., City and County Bldg., Denver, 400-unit Housing Project, Contr. 1, general work, Contr. 2, heating, Contr. 3, plumbing, Contr. 4, electrical work, Fairfax A, Sub-Project 1, Colo. 1-1. Plans deposit $25. Contr. 1, Fuller Co., Denver, $2,897,000.

▲ Ga., Atlanta—APARTMENTS—B.A. 8-8—Regents, unincorporated, 1-story, 6-unit, brick veneer apartments, Bolton Rd., Bolton Heights, Atlanta, Ga., Bolton, Dickey & Sharpe, Atlanta, archts.-engrs. Contr. Co., Walton-Bragg, $1,014,-865. CD 7-6.

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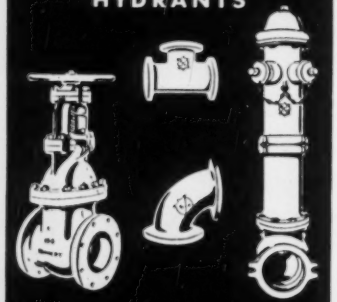

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▲ Ga., Athens—LIBRARY—Bd. Regents, University System of Georgia, c/o Cooper, Bond & Cooper, archts., Henry Grady Bldg., Atlanta. Aug. 3, library at University of Georgia, from Virginia Eng. Co., Newport News, $1,453,000. CD 6/23.

Ga., Dahlonega—DORMITORY—Bd. Regents of University System of Georgia, c/o Wm. J. J. Chase & Assocs., archts., 140 Peachtree St., Atlanta, Aug. 2, dormitory at North Georgia College, from Bailey-Brazell Constr. Co., Cleveland Bldg., Greenville, S. C., $427,623. CD 7/11.

Ill., Chicago—JUVENILE DETENTION HOMES—Cook Co., County Bldg., Zone 2. Aug. 2, juvenile detention home addn., from J. W. Snyder Co., 307 N. Michigan St., Zone 1, $433,837. CD 6/3.

La., Jennings—SCHOOL—Jefferson Davis Parish School Bd., Jennings, Aug. 3, high school from Tudor Constr. Co., Box 1232, Alexandria, $643,216. CD 7/18.

Me., South Portland—SCHOOL—City, July 7, 24 classroom Junior High School, from Consolidated Constr., Inc., 976 Congress St., Portland, $516,400. CD 7/24.

Mass., Marblehead—HOUSING—Town Housing Auth., 3 Pierce St., July 19, 54 family units, 27 duplex bldgs., State Aided Proj. 200-2, Sevinor St., from S. & A. Allen Constr. Co., Inc., 262 Washington St., Boston, $588,590. CD 6/29.

Mass., Somerset—SCHOOL—Town school bldg. Comm., June 27, 1 and 2 story, 14 classroom junior high school and gymnasium at County St. and Luther Ave., from Fred J. Rudd, 534 Westlawn St., Fall River, $569,858. CD 7/14.

N. H., Dover—HOSPITAL—City, city mgr. office, City Hall, rejected bids July 7 altering hospital and Wentworth Hospital Annex, $500,000. CD 6/23.

N. Y., Brooklyn—PAINT SHOP—Bd. Transportation, 250 Hudson St., New York, Zone 13, July 21, general contr., plumbing, fire protection for construction of paint shop for E. 174 St. Depot, Bway. and Jamaica Aves., from Atlas Tile & Marble Works, Inc., 238 E. 26 St., New York, $517,375. CD 7/5.

N. C., Reidsville—SCHOOLS—Reidsville Grade School Dist., Kearns R. Thompson, chn., Bd., Reidsville, Reidsville Negro School gymnasium bldg. to Reidsville High School, North Edgewood addn., from L. B. Gallimore, Greensboro, $625,000, est. $500,000. Lindsey M. Gudger, 52 Carter St., Asheville, archt.

Pa., Selinsgrove—COTTAGES—General State Auth., 18 and Herr Sts., Harrisburg, July 26, general constr., cottage for boys and cottage for girls at the Selinsgrove State Colony for Epileptics from Boyd H. Kline, Bloomsburg, $558,576, est. $700,000. CD 6/30.

▲ Wis., Oshkosh—HOSPITAL—Winnebago Co., Oshkosh, Aug. 3, general contract, 2 story, bomb-r, rein-con., brick, terra cotta, & portland stone hospital, from Geo. A. Fuller Co., 111 W. Washington St., Chicago, Ill., $1,486,000. CD 6/21.

† Alaska, Fort Richardson—QUARTERS—U. S. Eng., Anchorage, July 27, two 2 story 20-man bachelor officers' quarters, Specs. 549-507-50-28, from J. H. Pomeroy & Co., Inc., 333 Montgomery St., San Francisco, Calif., $321,000, Est. $252,189. CD 7/10.

† Alaska, Fort Richardson—SERVICE CLUB—U. S. Eng., Anchorage, July 27, 2 story enlisted men's service club, from J. H. Pomeroy & Co., Inc., 333 Montgomery St., San Francisco, Calif., $511,000, est. $349,616. CD 7/7.

Ont., London—SCHOOL—Bd. Educ., R. Hill, chn., London, July 13, H. B. Real Technical & Commercial High School, from Sterling Constr. Co., 1132 2494 Sandwich St. E., Windsor, Approx. $582,798. CD 6/23.

CONTRACTS AWARDED

Ark., Little Rock—OFFICE—State Welfare Bd., Little Rock, office, to Linebarger Constr. Co., 222 Scott St., $563,860. Bids 8/1. CD 7/13.

Calif., Inglewood—HIGH SCHOOL—Centinela Valley Union High School Dist., 235 Grevillea St., Morningside High School, 200 St. and Yukon Ave., to R. J. Daum Constr. Co., and W. J. Disteli, 6804 West Blvd., Los Angeles, $422,085. Bids 7/25. Awarded 8/1.

Colo., Aurora—SCHOOL—Bd. Educ., School Dist. 28 J, Consolidated Dist. of Adams and Arapahoe Co., 9745 E. Cortex St., general contract, two 1 story, 176x360 ft., brick grade schools, to N. P. Nielsen, 632 Detroit St., Denver, $437,289. CD 7/28.

▲ Conn., Bridgeport—BUS TERMINAL, etc.—City, City Hall, bus terminal and municipal parking facilities, to Fauge Constr. Co., 74 Goodwin St., $1,035,400. Bids 7/18, awarded 7/25, under LB.

▲ Ill., Champaign—HOUSING—City of Champaign Housing Auth., Champaign, $1,365,000, Housing for Bonfey Inc., Bloomington, $1,238,600. Awarded 8/1.

Ill., Charleston—RESIDENCE HALL—State, Springfield, general contract residence hall at Eastern Illinois State College, to W. H. Frankel Co., 217 E. Laurel St., Springfield, $710,870. Bids 7/18, awarded 8/1. CD 7/7.

Ill., Joliet—CELL HOUSE—State Div. & Architecture, Springfield, general contract, cell house alteration at Illinois State Penitentiary, to J. L. Simmons Co., Inc., 211er N. Woodland St., Decatur, $709,270. Bids 6/27, awarded 8/7. CD 7/7, under LB.

▲ Ind., West Lafayette—RESIDENCE HOUSE, etc.—Purdue University, West Lafayette, men's x shaped residence hall to J. L. Simmons Co., 710 Union Title Bldg., Indianapolis, $2,359,000; 2 story addn. to chemistry bldg., and 1st unit of Life Science Bldg., to Karl H. Kettelhut, West Lafayette, $946,500 and $1,248,800 respectively; service bldg., to A. E. Kemmer, Lafayette, $598,420. Grand total $5,151,720. Bids 8/3, awarded 8/4. CD 7/14.

Ia., Newton—SCHOOL—Newton Ind. School Dist., Newton, general contract high school, to Garmer & Stiles, 519 14 St., Des Moines, $791,536. Bids 7/27. CD 7/12.

La., Lafayette—HOUSING—Lafayette Housing Auth., c/o contractor, housing units, office and administration bldgs., to R. P. Farnsworth & Co., P.O. Box 2029, Baton Rouge, $678,000. Bids 6/2. CD 6/7.

Mass., Stoughton—SCHOOL—Town, School Bldg. Comm., 14 classroom West Elementary School, Central St., to Tomkinson Bros. Co., 372 Langley Rd., Newton, $491,000. CD 8/1 under LB.

Minn., Albert Lea—SCHOOL—Bd. Educ., W. B. Lyon, clk., 2 story, 200x300 ft. school and gymnasium, to Kraus Anderson of St. Paul Co., 140 Ramsey St., St. Paul, $483,000. Bids 7/31. CD 7/7.

N. C., High Point—SCHOOLS—Bd. School Comrs., 900 English St., First Ward Elementary School and Wm. Penn High School, to R. K. Stewart & Son, High Point, $704,000. Bids 6/20. CD 6/28, under LB.

Pa., Mayview—TUBERCULOSIS PATIENTS BLDG.—General State Auth., 18 and Herr Sts., Harrisburg, general contract tubercular patients bldg. at Mayview State Hospital to Henry Busse, 112 Wabash St., Pittsburgh, $679,679. Bids 7/19, awarded 7/31. CD 7/21, under LB.

▲† Tenn., Oak Ridge—SUB-STATION—Atomic Energy Comm., Oak Ridge, electrical sub-station, switchhouse and switchyard, to Gustav Hirsch Organization, Inc., 310 W. Broad St., Columbus, O., $7,374,100.

Tex., Dallas—HIGH SCHOOL—Dallas Independent School Dist., Axard and Royal Sts., Booker T. Washington High School for Negroes, to J. W. Bateson Constr. Co., Inc., Irwin Keasler Bldg., $618,221. Bids 8/1. CD 6/28.

Tex., Pampa—SCHOOL—Pampa Independent School Dist., Pampa, school addns., to J. T. Taylor & Sons, Inc., Box 225, Fort Worth, $616,959. Bids 7/20. CD 8/1, under LB.

Va., Richmond—SCHOOL ADDN.—City, School Bd., Bonsor School for Negroes addn., to E. H. Wattinger, 6 E. 6th St., Richmond, $642,800. Bids 7/31. CD 7/5.

B. C., Port Alberni—SCHOOL, etc.—Alberni School Dist., No. 47, Port Alberni, high school and elementary school alterations and addns., to Baynes Manning, Ltd., 1010 Seymour St., Vancouver. Approx. $410,508. Bids 7/3. CD 7/19, under LB.

B. C., Prince Rupert—SCHOOLS—Prince Rupert School Bd., Prince Rupert, New Booth Memorial High School, and King Edward Public School, to B. C. Bridge & Dredging Co. Ltd., 1100 Pender St., Vancouver, $702,587. Bids 6/30, awarded 8/3. CD 6/16.

B. C., Vancouver—OFFICE—Province of British Columbia, Permanent Bldg., Victoria, 2 and 3 story, 50x310 ft. office bldg. for Workmen's Compensation Bd., to Armstrong & Monteith Constr. Co., Ltd., 1349 Hornby St., $747,690. Bids 7/3. CD 7/13, under LB.

Ont., Whitby—HOME—Ontario Co., G. Manning, clk., Ontario County Home for the Aged, to George Hordy Ltd., 165 Wicksteed Ave., Leaside. Approx. $850,000. Bids 7/10. CD 6/19.

COMMERCIAL BUILDINGS

BIDS ASKED

N. Y., Bronxville—EDUCATIONAL BUILDINGS—B.A. 8/22—Concordia Collegiate Institute, 171 White Plains Rd., library, science bldg. and auditorium, White Plains Rd. and Tanglewylde Ave., $900,000. Chapman, Evans & Delehanty, 50 Broadway, New York, archts. CD 2/27/48.

Va., Farmville—HOSPITAL—B. A. 8/22—Southside Community Hospital, Farmville, brick, concrete, steel, terrazzo, limestone hospital alterations and addns., $400,000. Plans deposit $30. Baskerville & Son, Central Natl. Bank Bldg., Richmond, archts.

Va., Norfolk—DEPARTMENT STORE—B.A. 8/22—W. T. Grant Co., 1441 Broadway, New York, N. Y., 4 story, 82x210 ft. department store.

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Wis., Appleton—SCHOOL—B.A. 8/22—St. Joseph Catholic Congregation, 2 story, burnt, F-shaped, 60x240 ft., reinf.-con. steel brick, stone parochial grade school. Geo. Narovec, 1210 W. Wisconsin St., archt. CD 4/14.

B. C., Vancouver—OFFICE—B.A. 8/22—McCarter & Nairn, archts., 1930 Marine Bldg., 5 story full burnt, 50x100 ft., reinf.-con. office, for Canada Permanent Mortgage Corp., 432 Riccards St., $700,000. Plans deposit $50. CD 3/27, 49.

▲ Pa., Reading—PHYSICAL EDUCATION—B.A. 8/24—Alvin F. Lange, 13 and Exeter Sts., physical education bldg., $1,000,000. Muhlenberg Bros., 1139 A. S. 4 St., archts.

Pa., Spangler—HOSPITAL ADDN.—B.A. 8/24—Miner's Hospital, Spangler, hospital addn., $50,000, archs., W. Hoover, 716 Penn Ave., Pittsburgh, archts.-Extended date. CD 6/47.

▲ Ind., South Bend—SCIENCE RESEARCH, etc.—B.A. 8/24—negotiated—Office, University of Notre Dame, South Bend, science research and laboratory, Notre Dame Campus, $1,750,000. Maginnis & Walsh, 126 Newbury St., Boston, Mass., archts. CD 4/20.

▲ N. Y., Jamaica—HOSPITAL—B.A. 8/29—Jamaica Hospital, 89 Ave. at Van Wyck Blvd., general contract, hospital addn., $1,200,000. Extended date. Bennett & Wurtz, 213 E. 30 St., New York, N. Y., archts. 6/24.

Ill., Melrose Park—OFFICE—Bids Asked—Mascioli Steel Co., 1220 N. 25 St., 1 story, burnt, 20,000 sq. ft., steel, concrete, brick office, $100,000. A. W. Krieg, 2530 Burr Oak St., Riverside, archt.

Mich., Detroit—APARTMENT—Bids Asked—Irving Jacobson, 19 Ave., archt., 1006 Easton Tower, 4 story, brick apartment, Whittmore Rd., $275,000.

Mo., Independence—DEPARTMENT STORE—Bids Asked—Jones Store Co., 12 and Main Sts., Kansas City, mercantile store, $1,000,000. W. F. Hyberton, 19 W. 10 St., Kansas City, archt. CD 3/29.

Que., Quebec City—CHURCH—Bids Asked—Levesque & Levesque, 1150 Turnbull Ave., PQ1126, Quebec City, archts.-engrs. Contract let to Cote & Abraham Inc., Lorette, $250,000. CD 6/13.

SOON LETS CONTRACT

Conn., Milford—HOSPITAL—Milford Hospital, Inc., Bridgeport Ave., soon lets contract new hospital, Bridgeport Ave., $500,000. Dwight, Gage & Dwight, Inc., 111 West Elm St., New Haven, archt. CD 7/7.

Ill., Chicago—CHURCH—St. Sebastian Parish, 924 W. Huron St., Zone 22, soon lets contract 2 story, brick church addn., remodeling, $250,000. Eisler & Kay, 53 W. Jackson St., Zone 4, archts. $

Kan., Topeka—HOME ADDN.—Methodist Home for Aged, 1135 College Ave., soon lets contract home addn., $750,000. Schaver & Swanson, 4121 Harrison St., Omaha, archts. CD 4/24.

Mich., Greenville—HOSPITAL—Bd. Trustees, Greenville Memorial Hospital, contract basis, steel to be used in hospital addn., $600,000. Bennett & Straight, 13424 Michigan St., Dearborn, archts.

Mich., Traverse City—HOSPITAL—James Decker Munson Hospital, Traverse City, soon lets contract 3 story, brick, steel, concrete hospital addn., $425,000. Lewis & Jones, 258 Division St. at Battle Creek, archt. CD 6/23.

▲ Neb., Omaha—HOME—St. Vincent's Retreat for Aged, 24 and Ave. A, soon lets contract home for aged, Ave. A, $1,000,000. Steele, Sandham & Steele, Electric Bldg., archts.

▲ Pa., Easton—NURSES HOME, etc.—Easton Hospital, 21 and Lehigh Sts., soon lets contract nurses home, $400,000; hospital addn., alterations, $1,000,000. Wm. H. Lee, 14 and Ferry Sts., Bethlehem, archt. Wm. H. Lee & Son, 115 Broad St., Phila., engr. CD 6/29, 45.

▲ Pa., Phila.—OFFICE—Greenberg & Shegan, archts., 213 S. Broad St., soon lets contract 16 story office for 1519 Locust St., Girard Trust Co., $1,000,000. Dean Hoover & Julius Dorfman, 1411 Walnut St., archts. CD 5/8.

Tenn., Memphis—OFFICE—John T. Kinnebrew Jr. & George E. Kinnebrew, 67 Madison Ave., archts., Stevick Bldg., soon lets contract 3 story, 60x60 ft., brick office, Airways Plaza. Office bids Aug. $400,000. CD 7/19.

Tex., Dallas—MEDICAL—Boston Ave. Medical, Inc., c/o Erich Steen, 6232 Prospect St., soon lets contract 3 story, burnt, 60x140 ft., steel, brick, tile wall medical bldg., $500,000. J. A. Ritzmer, 1012 Southland Life Bldg., archt.

▲ Wis., Appleton—OFFICE—Aid Assoc. of Lutherans, Appleton, soon lets contract, 10 story, 98x135 ft., office, Appleton & Taylor sts. Approx. $2,500,000. Holabird & Root, 209 Boylston St., Boston, Mass., archts. and Maurey Lee Aires, Appleton, archt. assoc. CD 4/26.

LOW BIDDERS

▲ Calif., San Francisco—HOSPITAL WING—Diocesan Hospital, Guerrero St. at Ave. I, 3 story, reinforced, earthquake resistant hospital wing, remodeling and furnishing, Mission Center Co., 210 Post St., Bldg. $2,906,239. CD 7/7.

Neb., Omaha—SCHOOL—Blessed Sacrament Rectory, 52 and Ave. A, 2 story, brick rectory, Ave. A and 52 St., Sacrament Church, Ave. A and 52 St., $65,680. Leo A. Daly & Son, 5411 Leavenworth St., Omaha, archts. CD 6/29.

Tenn., Nashville—OFFICE—Methodist Bd. Educ., c/o Donald W. Southgate, archt., Nashville Trust Bldg., office, from W. F. Holt & Sons, Inc., 1531 Demonbreun St., $879,949. CD 7/26.

▲ Tex., Houston—HOSPITAL—Arabia Temple Shrine, AAONMS, 1322 Prairie St., rejected bids Feb. 21, 8 story, burnt, hospital for crippled children, L.B. $1,144,700. CD 3/1, under L.B.

Wis., Beaver Dam—HOSPITAL—Lutheran Deaconess Hospital, Beaver Dam, July 20, general contract, hospital addn., from Ben B. Gunter Co., 28 State St., Oshkosh, $419,858. CD 6/14.

CONTRACTS AWARDED

Ark., Little Rock—EDUCATION'S OFFICE—Arkansas Baptist Hospital, 22 and Marshall Sts., 3 story, concrete, brick bldg., to The Baldwin Co., Wallace Bldg., $525,457. CD 3/30.

Ark., Little Rock—EDUCATIONAL BLDG., etc.—Immanuel Baptist Church, 10 and Broad Sts., educational bldg. and rectory, to Baldwin Co., Wallace Bldg., $403,000. CD 6/2, under L.B.

▲ Calif., San Diego—SCHOOL—Roman Catholic Archbishop of San Diego, 1528 4 Ave., 3 story, 240,000 sq. ft., reinf.-con., school for San Diego College for Women, to Griffith Co., Box 16, Hillcrest Sta., San Diego, Approx. $3,000,000. Frank Hope, Bank of America Bldg., archt. CD 5/2, under L.B.

Calif., Whittier—DWELLINGS—Keebo Corp., 2301 Colorado Blvd., Los Angeles, 99 stucco dwellings on Rose Hedge, Darby and Kenilworth Aves., Beverly and Kearney Drives, and Rideout Lane, Owner builds. $632,280. Hope & Roach, 513 Knight Way, LaCanada, archts.

Fla., Gainesville—HOMES—A. A. Annis, Gainesville, 40 stucco dwellings, Annis Park Subdivision, Owner builds. $750,000. Architect—Annis.

Fla., Surfside—APARTMENT DEVELOPMENT—Surf Club Properties, Inc., apartment, to Frank J. Regney Corp., 1000 N.E. 84 Ave., Miami. Approx. $500,000. CD 4/26, under L.B.

Ga., Atlanta—BANK—Citizens & Southern National Bank, c/o contractor Mitchell Street Branch Bank, to Deers Constr. Co., 70 Ellis St., N.E., Approx. $700,000. CD 5/17.

Ga., Atlanta—CHURCH—West End Baptist Church c/o contractor, church, to The Flagler Co., Techwood Dr., N.W., Approx. $500,000. CD 6/14-45.

▲ Ga., Augusta—HOUSING UNITS—John W. McDonald, Jr., Augusta, 200 housing units on East boundary, Owner builds. $1,000,000.

Ill., Chicago—CHURCH—Catholic Bishop of Chicago, 720 N. Rush St., St. Joseph Lot, Zone 11, Boxed in inches, to Frank Burke & Sons, 35 S. Dearborn St., Zone 3, $600,000. Awarded 7-14. Edward J. Schulte, 7220 Miller St., Cincinnati 0., archt.

Ia., Iowa City—HOUSING—Grandview Court, Inc., Marjorie Ave. and Sunset Dr., homes, to Karl Wirth Constr. Co., Ainsworth, $900,000. Federal Emp. Co., for rent only.

Kan., Kansas City—HOUSING—Hawthorne Apartments, Inc., Inc., Finance Bldg., Kansas City, Mo., apartments, to Brown-Hawkins Constr. Co., Finance Bldg., Kansas City, Mo., $660,000. F. L. Hawkins, Finance Bldg., Kansas City, Mo., archt.

Ky., Lexington—HOTEL—Owner, c/o contractor, 130 room suburban Campbell House Hotel, at Harrodsburg and Zandale Rds., to R. D. Short Constr. Co., 124 Main St., $700,000.

Ky., Louisville—THEATRE, etc.—M. Switow & Sons, Enterprises, 2328 Portage Dr., Zone 4, 1 story, burnt, 62x162 ft., steel, brick on concrete block theatre and 80x163 ft. paved area for Ale Bonstein, 1219 S. Logan St., Zone 4, $750,000. Bids 7-14. Awarded 7-25. Walter C. Wagner, 311 Fincastle Bldg., archt.

La., New Orleans—HOMES—Hendee, Inc. & Wagner, Inc., c/o contractor, 84 homes, to Aurora Development Co., 104 Finland Place, $500,000.

Me., Biddeford—HOSPITAL—Webber Hospital Association, 350 Elm St., 2 story, brick, steel hospital addn. and alterations, Elm St., to Brown Constr. Co., 542 Congress St., Portland, $752,000. Awarded 7-24. Bids 4-19. CD 10-17-49.

Mich., Detroit—APARTMENT—Owner, c/o Charles H. Auer, Penobscot Bldg., 4 story, brick masonry on family unit apartment, Covington Dr., Owner builds. $400,000.

Mich., Jackson—HOUSING—Gutmann Realtors, Vanden Park, 60 family unit frame housing at Vanden Park 2, to Home & Garden Corp., 3136 Guardian Bldg., Detroit. Approx. $400,000.

Minn., Duluth—APARTMENT—Mount Royal Corp., c/o A. R. Mesaros, archt., 603 Alworth Bldg., general contract, apartment, 101-107 Fitgerald St., to Northern Builders, 311 Board of Trade Bldg., Fargo, N. D., $650,000. A. R. Mesaros & Alworth Bldg., archt.

Minn., Minneapolis—APARTMENT—Owner, c/o contractor, apartment, 10 story, 176x100 ft., reinforced concrete, 32 E. 22 St., to Lovering Construction Co., 416 Guardian Bldg., St. Paul, $500,000. A. M. Hermann & M. V. Bergstedt, 345 Minnesota St., archts.

Minn., Minneapolis—BUILDING—Twin City Federal Savings & Loan Assn., 8 St. and Marquette Ave., general contract, alterations and enlargement (2 story), to Soucheray-Kiley Co., Builders Exchange Bldg., $90,000. Correction.

Mo., Lemay (St. Louis 23, P. O.)—CHURCH—St. Matthew's Evangelical & Reformed Church, 4 Ave. & Lemay Ferry Rd., to Rees Builders, 618 S. Rock Hill Rd., Lemay, Zone 23, 2 story, colored Lannon stone, steel, concrete church and 2 story, burnt, 55x172 ft. and 39x100 ft. T-shaped rectory, Telegraph Rd. and Rose Ave., to Koetter & Kerth, Beck Ave., St. Louis, Zone 16, approx. $400,000. Bids 7-25. CD 7/7.

Mont., Anaconda—SCHOOL—Catholic Church, Anaconda, general contract, Cathedral High School, to Axelson Constr. Co., Missoula, $452,085. Bids 7/31, awarded about 8/3.

▲ N. Y., Babylon—HOMES—K. S. K. Building Corp., Nathan Kramer, Arthur H. Spiegel & Martin Kane, 2243 Vayview Ave., Wantagh, 150 homes, to be known as Parkdale Estates. Owner builds. $6,750,000.

N. Y., Beacon—HOMES—Strasser Housing Corp., 50 Broad St., 83 ranch style homes. Owner builds. $830,000. Joseph Orlando, 5 Buerkin St., Brooklyn, archt.

▲ N. Y., East Hempstead—HOMES—Green Valley Homes, Inc., c/o Edward F. Dranch & Ernest Amoruso, 146-07 Jamaica Ave., 100 ranch-style homes on 21 acres, Front St. and Merrick Ave. Owner builds. $1,150,000.

N. Y., New York—APARTMENT—70 Riverside Inc., 212 E. 70 St., 6 story apartment 70 Riverside Dr. Owner builds. $600,000. Horace Ginsberg & Assoc., 200 E. 42 St., archts. Sidney Ferguson, 120 Liberty St., engr.

▲ N. Y., Wantagh—DWELLINGS—Irving Jacobson and Jacob J. Block Estate Constr. Co., 10-15 Queens Blvd., Elmhurst, L. I., 100 dwellings, Seek Rd. in East Wantagh. Owner builds. $1,149,000.

N. C., Charlotte—RESIDENTIAL DEVELOPMENT—L. A. Danes, Charlotte, residential development, Asbomore Rd. Owner builds. $500,000.

N. C., Greensboro—CHURCH—First Baptist Church, Greensboro, general contract, to Council Co., Greensboro, $820,000. Bids 7-11. CD 7/26, under L.B.

Pa., Norristown—RESIDENTIAL DEVELOPMENT—Levy & Nevins, 4516 Germantown Ave., Phila., residential development, Plymouth Twp., separate contracts, $700,000. James A. Nolen Jr., 6516 Germantown Ave., Phila., archts.

Pa., Phila.—RESIDENTIAL DEVELOPMENT—A. P. Dellen & Co., 100 W. Rockland St., residential development, Tenth and Forrest Ave., separate contracts, $792,000.

Pa., Pittsburgh—SCHOOL ADDN.—University of Pittsburgh, Forbes St., 2 story 60x100 ft. brick, steel Fox Elementary School addn., to Geo. Seamon Co., 4501 Liberty Ave., Approx. $750,000. Bids 7-12. CD 7-19.

▲ Pa., Willow Grove—RESIDENTIAL DEVELOPMENT—Parkwood Homes Co., Hatboro, residential development and Maryland Rds., separate contracts, $1,000,000.

Pa., Woodlynne—RESIDENTIAL DEVELOPMENT—Robert Bell & Sr., Mear, residential development, Washington Blvd., Roberts and Edmonds Lanes, separate contracts, $500,000.

Tenn., Knoxville—APARTMENT—Shell Realty Trust, c/o contractor, apartment, Broadway Towers, to Construction Management Service, Inc., P. O. Box 1370, Knoxville, Approx. $500,000.

Tex., Arlington—DWELLINGS—Broadway Realty Co., 2000 Broadway, Fort Worth, 100 apartment type dwellings, Approx. $875,000. CD 6/5.

Tex., Beaumont—DEPARTMENT STORE—Orleans-Rowe Street Corp., Beaumont department store remodeling to W. W. Collins, 2648 Proctor St., $585,000. CD 7/27.

Tex., Dallas—HOSPITAL—St. Paul's Hospital, 3121 Bryan St., general contract 6 story, burnt, hospital, alterations, to Henry S. McKee, Inc., P. O. Box 5873, $873,220; mechanical—The Farrell Co., Buckner Blvd., $343,500. Bids 6/28. CD 7/7, under L.B.

▲ Tex., Fort Sam Houston—HOUSING—Commanding Officer 4th Army, Fort Sam Houston, construct, manage and finance 700 officers dwelling units and 300 more dwelling units, officers' open mess and golf course, Kelly Air Force Base, Hub Hill & Assocs., Andrews Bldg., Dallas (sponsors and general contract to Elliott Constr. Co., 210 Dan Edel, Room 832, Anthony Hotel, San Antonio, $1,620,000 and $2,430,000 respectively. Correction—contract awarded 7-3-49, under GA.

Tex., Fort Worth—HOTEL—Western Hills Hotel, Inc., c/o H. S. Green, 401 Crestwood St., hotel, Camp Bowie Blvd. to T. M. Moore Constr. Co., 2065 Montgomery St., $965,000. CD 7/27. C. S. Bilbrey, Wine Oak Lane, Dallas and Carlos R. Schoepfle, Fort Worth Press Bldg., Fort Worth, archts.-engrs.

Tex., Houston—DWELLINGS—Farnsworth Co., Inc., 1932 South Blvd., 50 addtl. dwellings, Lamar Terrace, Owner builds. Approx. $750,000. CD 7/31.

Tex., Houston—HOMES—Golden City Park, Inc., 3434 Arbor St., 1000 negro homes, P. O. Montgomery, Inc., Owner builds. Approx. $625,000. CD 4/20.

Tex., Houston—DWELLINGS—Shepherd-Cavitt, Realty & Building Co., 4311 Elm Bldg., 40 dwellings from Elk Forrest and Proj. Owner builds. Approx. $550,000. CD 7-27.

Tex., Houston—APARTMENT—King & Street City National Bank Bldg., 100 apartment units, adjacent Rice Hotel, Soucheray, Owner builds. Approx. $750,000. CD 4.

Tex., Houston—DWELLINGS—N. H. Mitchell, F. J. Grigsby & Preston R. Poynter, c/o 4500 Griggs Rd., 100 dwellings, Griggs Rd. Owner builds. $725,000. CD 7-27.

Tex., Houston—HOTEL—The Petroleum Club, Fire Hotel, Inc., 1000 block Rusk, Fire of Rice Hotel, to Contractors for Petroleum Club to Manhattan Constr. Co., 2025 Polk St., Approx. $700,000. CD 4-2.

Tex., Houston—DWELLINGS—Stallmar Lumber Co., c/o H. J. Stallman, 4007 Greenbrier St., 50 dwellings off West Lane Rd. Owner builds. Approx. $950,000. CD 6/30.

Tex., Houston—DWELLING UNITS—Miles Strickland, 2nd National Bank Bldg., 400 addn. dwelling units, Road and Woodlawn Acres. Owner builds. $925,000. Knustran & Webster, 2017 W. Gray St., archt.

Tex., Houston—HOUSING—D. J. Zapotto & Assoc., West Bldg., 200 addn. housing units, Industrial area. Owner builds. $925,000. CD 11/19/49.

▲ Tex., Lubbock—DWELLINGS—Urban Development Corp., c/o Sam Lemons, 1 block 300 brick dwellings. Owner builds. Approx. $1,750,000. CD 6/23.

Tex., San Antonio—RESIDENCES—Quail-Cot Co., c/o L. R. Pietz, 1426 N. Brazos St., 100 addn. residences. Owner builds. Approx. $550,000. CD 7/21.

W. Va., Wheeling—CHURCH, etc.—St. Michaels R.C. Congregation, Wheeling, granite steel church, rectory and convent, to Southeastern Constr. Co., Peoples Bldg., Charleston. Approx. $500,000. Rev. M. Mcmenemy, Belmont Abbey, N. C., archt.

INDUSTRIAL BUILDINGS

BIDS ASKED

Mich., Hamtramck—GARAGE and OFFICE—B.A. 8/21—Sun Oil Co., 1608 Walnut St., Phila., Pa., garage and office addn. Approx $68,000. John R. Johnson, 1608 Walnut St., Phila., Pa., engr.

▲ Ill., Chicago—BAKERY—B.A. 8/22—National Biscuit Co., 449 W. 14 St., New York, N. Y. bakery 73 St. and Kenzie Ave., $8,000,000. Alexander D. Crovett, 27 William St., New York, N. Y. archt. Extended date, CD 7/28.

N. C., Burlington—SALES—B.A. 8/25—Spence Motor Co., Burlington, remodeling bldg. Plans deposit $25, $10 each mechanical. Bid date changed. Henry T. Gurley, Burlington, engr. CD 8/3.

N. C., Burlington—SALES, SERVICE—B.A. 8/26—Spence Motor Co., c/o Henry T. Gurley, engr., Burlington, auto sales and service bldg. Plans deposit $25.

Ill., Chicago—FACTORY, OFFICE—Bids Asked—Risher Fire Brick Co., 2445 S. Ashland St., Zone 8, 14,000 sq. ft. factory office, $75,000. A. Epstein & Sons Co., 2011 W. Pershing St., Zone 9, archts.

▲ La., Blanchard—GAS COMPRESSOR STATION—Bids Asked—Arkansas-Louisiana Gas Co., Slattery Bldg., Shreveport, 7,000 hp. gas compressor station. $1,507,000. CD 6/12.

▲ La., Sterlington—PLANT—Bids Asked—Commercial Solvents Co., Maxine and Sterlington, nitrogen solution plant. $1,000,000. CD 7/27.

Pa., Phila.—SALES and SERVICE—Bids Asked—Gillespie Motors, Inc., 4120 Lancaster Ave., 1 story, 70x100x40 ft., concrete block, steel, auto sales and service bldg. $150,000. James A. Lord Wm. H. Lord, Market St., Upper Darby, archts.

Pa., Phila.—WAREHOUSE, etc.—Bids Asked—Owner, c/o Herman H. Kline, archt., 1711 Chestnut St., 1 story, 80x150 ft., warehouse and office, $120,000.

▲ Tex., Snyder—PLANT—Bids Asked—Sunray Oil Corp. & Associated Producers, Pittsburg Bldg., Tulsa, Okla., gas conservation extraction plant. $1,000,000. CD 7/13.

Tex., Wichita Falls—PLANT—Bids Asked—Hutton Trust, Wichita Falls, gas injection plant. $750,000.

Ont., Chatham—PLANT—Bids Asked—Canada Packers Ltd., 230 St. Clair Ave. W., Toronto, 1 story 196x200 ft., fertilizer plant in Industrial Park. Approx. $450,000-$500,000.

Que., Joliette—WAREHOUSE—Bids Asked—R. & G. Charbonneau, archt., 6760 Ste. Del. Nelges Rd., Montreal, 1 story 80x196 ft., structural steel, brick, concrete storage warehouse, for Pinetel Pierce Dye Works Ltd., Archambault St. Approx. $200,000.

SOON LETS CONTRACT

Ill., Bellwood—GARAGE, etc.—Public Service Co. of Northern Illinois, 72 W. Adams St., Chicago, soon lets contract 1 story garage, material yard, and 1 and 2 story offices, $400,000. CD 8/24-45, under Commercial Bldgs.

Ill., Chicago—FACTORY—Illinois Paint Co., 1834 S. Kostner St., Zone 24, soon lets contract 1 story, bonnet, 67,000 sq. ft. factory addn. $350,000. John S. Redden, c/o owner, archt.

LOW BIDDERS

Ga., Atlanta—WAREHOUSE—Standard Oil Co., c/o Tow Binkley, Jr., 41 warehouse from Wesley & Co., 285 Hopkins St. N.W. $308,477. CD 7/17.

Ind., Jeffersonville—WAREHOUSE—Colgate Palmolive Peet, Jeffersonville, 1 story 25, 200x407 ft. warehouse from Stone & Constr. Co., 147 N. Clay St., Louisville, Zone 2, Ky. Approx. $900,000. CD 7/19.

CONTRACTS AWARDED

Ala., Brewton—MILL—T. R. Miller Co., Brewton, design and construct in rebuilding mill, to R. S. Dow Co., Exchange Bldg., Birmingham. Approx. $750,000. CD 7/10.

Calif., Los Angeles—FACTORY—B. F. Goodrich Co., 500 S. Main St., Akron, O., 1 story factory addn., warehouse facilities addn. with shipping dock, to 12 railroad cars and 14 trucks, to H. K. Ferguson Co., 1741 E. 11 St., Cleveland. $300,000.

▲ Fla., Miami—SHOPS and YARD—Seaboard Airline Railway Co., W. D. Simpson, ch. engr., S.A.L.R.R. Bldg., Norfolk, 10, Va., railway shops and yard, to M. R. Harrison Constr. Co., 5137 N.E. 2 Ave. $1,126,000. Correction—(ust). CD 8/3, under CA.

▲ Ind., East Chicago—PLANT—Inland Steel Co., 38 S. Dearborn St., Chicago, Ill., open hearth plant of four 250 ton furnaces and auxiliary facilities at Plant 2 at Indiana Harbor Wks., on reclaimed Lake Michigan land, to Arthur G. McKee & Co., 2300 Chester St., Cleveland, O. Awarded 8/3.

Mo., Afton (St. Louis 23, P. O.)—PLANT—White Rodgers Electric Co., 1209 Cass Ave., St. Louis, Zone 6, 1 story, 350x400 ft. brick masonry, steel, reinforced factory for thermostatic controls. On 31 acre tract north side of Reavis Barracks Rd. east of St. Louis-San Francisco Ry. tracks, to Mississippi Valley Structural Steel Co., 3117 Big Bend Rd., St. Louis, Zone 17, and Stupp Brothers Bridge & Iron Co., 3900 Weber Rd., St. Louis, Zone 23. Approx. $500,000. Bids 7/12. CD 7/6.

N. M., Lovington—ELECTRIC GENERATING UNIT—Lea County Electric Co-operative, Inc., Lovington, electric generating unit to Fairbanks, Morse & Co., 1719 N. Market St., Dallas, Tex. $309,284. Continental Engineers, Inc., 1641 Broadway, Lubbock, Tex., engr.

O., Cleveland—PLANT—Great Atlantic & Pacific Tea Co., 3430 Groton St., coffee processing plant, southeast of race to Hamann Constr. Co., 25010 Lakeland St., $500,000.

O., Toledo—FREIGHT TERMINAL—Ira Davis, pres., Ira Realty Co., 1519 Elm St., motor and rail freight terminal, 4108 Lagrange St., to Conte Constr. Co., 912 Summit St. Approx. $350,000. Bids 5/15. CD 4/24.

Pa., West Mifflin—PLANT—Schwieder Bros., Inc., 428 High St., Ecorse, Detroit, Mich., 200x250 ft. brick, block, steel frame mfg. plant, separate contracts, $500,000. CD 7/21.

Tex., Dallas—PLANT—United States Envelope Co., 21 Cypress St., Springfield, Mass., 50,000 sq. ft. envelope mfg. plant, to The Austin Co., 5311 Mockingbird Lane. $775,000, Est. $600,000. CD 7/24.

Tex., Houston—SUB-STATION, etc.—Houston Lighting & Power Co., 1016 Walker St., sub-station addn. $325,000. Also electric appliance shop, storage and display, $85,000. Owner builds. CD 9/10/47.

▲ Tex., Sunray—REFINERY—Shamrock Oil & Gas Co., Sunray oil refinery, to Cook Constr. Co., 1528 Walnut St., Phila., Pa., $2,000,000.

Wash., Sunnyside—DAIRY—Carnation Co., Stuart Bldg., Seattle, Zone 1, general contract dairy addn., to Hall Brothers, Arctic Bldg., Seattle, Zone 4. Est. $350,000.

▲ B. C., Ocean Falls—SAWMILL, etc.—Pacific Mills Ltd., Ocean Falls, structural steel concrete sawmill and hog fuel storage plant, to Northern Constr. Co. & J. W. Stewart Ltd., 1304 Hornby St., Vancouver, $1,500,000. Awarded 7/29. Swan Wooster & Wooster, 718 Granville St., Vancouver, engrs. CD 8/28/47.

▲ Ont., Oshawa—WAREHOUSE—General Motors of Canada Ltd., Oshawa, 1 story, 388x350 ft. concrete, structural steel, brick central parts distribution warehouse, to Pigott Constr. Co., 1441 Pigott Bldg., Hamilton. Total est. Approx. $2,000,000. CD 4/13.

UNCLASSIFIED

Ont., Toronto—TELEVISION STATION—B.A. 8/22—Canadian Broadcasting Corp., P.O. Box 6000, Montreal, Que., 1 story, bonnet, 60x160 ft., reinforced brick television studio and transmitter station, Jarvis St. for C.B.C., 354 Jarvis St. CD 10/27.

Calif., San Francisco—BEACH IMPRVS.—B.A. 8/21—Clt. P. Wal., City Hall, Fetch report, at Phelan Beach, recreation area, spec. 20,754. Approx. $50,000. Plans deposit $10, Ralph Wadsworth, City Hall, city engr. CD 7/25.

Iowa—RURAL DISTRIBUTION LINES—B.A. 8/23—Farmers Electric Co-operative, Greenfield, 147 mi. rural distr. lines, 6.9 mi. conversion and 60.5 mi. line rebuild, to Rural Electric Supply Co., 1200 Main St., Dallas, Tex. Also Adams Electric Co-operative, Corning, $100,000. Phillip L. Rains, 630 Davenport Bank Bldg., Davenport, engrs. CD 7/20-48.

Missouri—RURAL DISTRIBUTION LINES—B.A. 8/23—Platte Valley Electric Co-operative, Gower, 264.6 mi. rural distr. lines and 10.6 mi. conversion to 7200/12470 v. Also Electric Co-operative, Greenfield, 147 mi. rural distr. lines, 6.9 mi. conversion and 60.5 mi. line rebuild. Henry, St. Clair and Vernon Counties, $300,000. Frank Horton & Lamar, engrs.

Kansas—RURAL DISTRIBUTION LINES—B.A. 8/24—Victory Electric Co-operative, Dodge City, 148.45 mi. rural distr. lines in Hodgeman, Finney, Gray, Ford, Edwards, Kiowa, Meade and Clark Counties, $175,000. Frank Horton & Co., Lamar, Mo., engrs. CD 5/26.

California—RURAL DISTRIBUTION LINES—B.A. 8/29—Pioneer Sierra Rural Electric Co-operative, Portola, 26.2 mi. 33 kv. transmission and 1,000 kva. sub-station. Plans deposit $25. Approx. $75,000. Plans deposit $25. Wonnacott & Bevan, 1016 20 St., Sacramento, engrs. CD 8/3.

Tex., Waco—FAIR GROUND—B.A. 8/25—McLennan County Livestock Assn., Waco, livestock display fair ground, bonnet. $300,000. CD 6/15.

Ont., Kingston—HEATING SYSTEM—B.A. 8/22—Canadian Government Ltd., Dept. 75, Lyon St., Ottawa, heating sub-station improvements at Fort Frontenac, for Dept. of Canada, Hunter Bldg., Ottawa. Plans deposit $25.

Pa., Phila.—PIERS, etc.—B. A. 8/28—National Sugar Refining Co., 129 Front St., New York, N. Y., piers and superstructure, Delaware Ave. and Shackamaxon St. Approx. $500,000. Paul P. Woenle, c/o owner, engr. CD 8/2.

LOW BIDDERS

▲ Michigan—FERRY DOCK, etc.—State Hy. Dept., Lansing, Aug. 3, ferry dock at St. Ignace, MBI of 49-8-11, C4, Mackinaw Co., from Luedtke Engr. Co., Frankfort, $1,334,884; ferry slip at Straits of Mackinaw, Mackinaw City, from S. P. Sargent, Saginaw, and R. C. Boyd, Dearborn, $476,662. CD 7/28, under Earthwork, etc.

Va., Norfolk—AIRPORT IMPVRS.—City, City Hall Bldg., Aug. 1, outside imprvs., utilities at Municipal Airport, Contr. A, from Wiley N. Jackson Co., Inc., R.F.D. 4, Roanoke, $397,525; Contr. B, from Mechanical Eng. Co., 232 Bank St., $88,042. CD 6/28.

Wyoming—RURAL DISTRIBUTION LINES—Niobrara Electric Assn., Lusk, 463.51 mi., rural distr. lines, Niobrara, Goshen and Platte Counties, from Williston Constr. Co., Sidney, Mont., $445,884. (Correction—status). CD 8/7, under LB.

CONTRACTS AWARDED

Calif., South Gate—ASSEMBLY and SERVICE—General Motors Corp., 2700 Bandy Blvd., assembly plant expansion and service bldg., to Lindgren & Swinerton Inc., 605 W. Olympic St., Los Angeles, $900,000. Bids 6/30. CD 6/21.

Illinois—RURAL DISTRIBUTION LINES—Wayne White Counties Electric Co-operative, O. J. Chaney, mgr., 212 E. Court St., Fairfield, 258 mi. rural distr. lines in Clay, Edwards, Hamilton, Jefferson, Marion, Richland and White Counties, $370,000, and 252.5 mi. rural distr. lines, Wayne Co., $390,000, own forces. CD 4/27/49.

Ind., Anderson—DRIVE-IN THEATRE—Tom Harmeson, S. J. Gregory, and P. H. Dee, c/o Tom Harmeson, Anderson Drive-In Theatre, Anderson, drive-in motion picture theatre, at intersection State Rds. 9 and 67 south of city limits, separate contracts, $100,000.

Iowa—RURAL DISTRIBUTION LINES—Southeast Iowa Electric Co-operative Assn., Warner A. Russell, mgr., Mount Pleasant, 50 mi. transmission lines, metering and switching station, Henry Co., to Trans-Electric Co., Louisville. $223,333. Bids 7/20. CD 7/7.

Fla., Tampa—MOTOR COURT—Clifford Gavel c/o contractor, motor court, to Edward L. Bolding Constr. Co., 506 S. Howard Ave. Approx. $50,000.

Mississippi—RURAL DISTRIBUTION LINES—Magnolia Electric Power Assn., McComb, 85 mi. rural distr. lines, Pike Co., etc. Owner builds. $60,000. CD 10/22.

Miss., Jackson—DRIVE-IN THEATRE—Leroy Roell, Jackson drive-in theatre. Owner builds. $90,000.

Missouri—PIPE LINE IMPRVS.—Shell Pipe Line Corp., Mayo Bldg., Tulsa, Okla., taking up and backfilling 190 mi. 10 in. products pipe line, Lebanon area to Truman Constr. Co., Inc., 1942 S. Rob St., Oklahoma City, Okla., $215,000.

Mo., Trenton—DRIVE-IN THEATRE—Commonwealth Amusement Corp., B. M. Shelton, vice pres. and gen. mgr., 215 W. 18 St., Kansas City, Mo., constr. 500-car capacity drive-in motion picture theatre on 15-acre tract on Rte. 65, near here. Separate contracts, $100,000.

Tenn., Memphis—MOTOR COURT—Arkansas Motel, c/o John Dequett, archt., Commerce Title Bldg., motor court. Owner builds. $250,000.

Texas—OIL LINES—Fluntex Pipe Line Co., Snyder, 32 mi. 8 in. crude oil delivery lines, Scurry Co., Purchase and fire. $145,000. CD 7/21.

Tex., Corpus Christi—UNDERGROUND CABLE—Central Power & Light Co., 120 N. Chaparral St., Unit B, underground cable, Purchase and Hire. $300,000. CD 6/9.

Tex., Houston—UNDERGROUND CONDUITS—Southwestern Bell Telephone Co., 1121 Capitol St., addn. unit of conduits for large cable, force account. $400,000. CD 5/9.

Wash., Pullman—STEAM PIPE LINES—Washington State College, Pullman, 7,540 ft. steam and condensate pipe lines, to Arnold & Jeffers, N. 1309 Ash St., Spokane, $142,279.

▲ W. Va., Clarksburg—TUNNEL—Baltimore & Ohio R.R. System, A. C. Clarke, ch. engr., Baltimore and Charles Sts., Baltimore, 1, Md., tunnel on main line approx. 5 mi. east of here, general contract, to Bates & Rogers Constr. Co., 600 W. Jackson St., Chicago, 6, Ill., tunnel approach cut and piling, to Keeley Constr. Co., Clarksburg. Total est. $4,000,000.

Wyoming—OIL PIPE LINE—Ohio Oil Co., Casper, 21 mi. 12 in. crude oil pipe line from Byron and Garland Oil Fields, to connect with present pipe line from Basin Field, Big Horn and Park Counties. Owner builds. $550,000. CD 6/16.

Alberta—GAS PIPE LINES—Canadian Western Natural Gas, Ltd., Edmonton, natural gas pipe line mains and domestic connections. Owner builds. $180,000. CD 1/31.

Ont., Deep River—FOUNDATION WALLS—Central Mortgage & Housing Corp., 195 Feet St. W., Toronto, permanent foundation walls under about 203 existing houses, to A. S. Peterson, Ltd., 1313 Wellington St., Ottawa. Approx. $210,000. A. J. E. Smith c/o owner, engr.

Proposal Advertisements see pp. 105 to 108

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Workmen's compensation is a fine thing—but it can't replace a mangled arm.

Safety laws prevent many accidents—but they can't cover every hazard of an individual plant.

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U. S. Government

GOVERNMENT OF THE DISTRICT OF COLUMBIA, DIRECTOR OF SANITARY ENGINEERING, D. C., August 9, 1950. SEALED PROPOSALS will be received in Room 509, District Building, 14th and E Streets, N. W., Washington 4, D. C., until 2:00 p.m., Daylight Saving Time, September 15, 1950, and then publicly opened and read for SLUDGE DRYING AND INCINERATING EQUIPMENT, SEWAGE TREATMENT PLANT, Washington, D. C. Proposal forms, specifications and drawings may be obtained in the office of Chief Clerk, D. E., Room 427, District Building (Telephone National 6000, Extension 2378), upon the deposit of a certified check, in the amount of Fifty Dollars ($50.00) for each set, made payable to the Collector of Taxes, D. C. (929)

OFFICIAL PROPOSALS

Bids: September 7, 1950 (936)

Structural Steel for Stadium

MILWAUKEE COUNTY PARK COMMISSION
Room 308—Court House
Milwaukee, Wisconsin

Sealed bids will be received at this office until 11:00 A. M., Thursday, September 7, 1950 to be opened at 2:00 P. M. of the same day in the County Board committee room before the Highway Committee of the County Board of Supervisors and the Milwaukee County Park Commission for the furnishing, fabrication, and delivery of:

2500 tons of structural steel for the Milwaukee County Stadium

in accordance with plans and specifications which will be available at the Milwaukee County Regional Planning Department, Room 303, Court House, after August 22, 1950. A deposit of $5.00 shall be required for all plans taken from the office. The deposit shall be refunded if plans are returned in good condition.

MILWAUKEE COUNTY PARK COMMISSION
August 9, 1950
Jerome C. Bretzka, Executive Secretary

Bids: August 29, 1950 (928)

Airport

PHILADELPHIA, PENNA.
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING, SURVEYS AND ZONING

Sealed Proposals will be received at Room 903 City Hall Annex, until 12:00 o'clock noon, Daylight Saving Time, Tuesday, August 29, 1950, and opened at that time in Room 903 City Hall Annex, Philadelphia, Penna. for

Philadelphia International Airport Schedule "A"—Installation of Drainage Pipes and Appurtenances for First Stage Apron and Field Expansion and for Grading and Paving Runway Extension, Taxiways, Portion of Apron and Adjacent Areas Contract No. A 181 SW.

The approximate quantities of the principal items are as follows:

9,400 lin. ft. of pipe underdrain
11,500 lin. ft. of stormwater drains—12 to 48 inches diameter
5,800 lin. ft. of stormwater drains—60 to 78 inches diameter
2,480 lin. ft. of main stormwater drainage line (multiple section)
2,800 lin. ft. longitudinal catch basins
80 manholes and catch basins
13,600 lin. ft. of relocated and new chain-link fencing and gates
212,000 cu. yds. of Unclassified Excavation
74,000 cu. yds. of Borrow Excavation
83,000 sq. yds. of 12 inch thick Portland Cement Concrete Pavement
165,000 sq. yds. Asphaltic concrete pavement (hot mix), 3 inches thick, on dry-bound macadam base course, 9 inches and 13 inches thick
39,000 duct feet Underground duct, cement-asbestos or fibre
36 acres—Clearing and grubbing

Proposal forms and specifications may be obtained in Room 1101 City Hall Annex. Blue prints of plans may be purchased at bidder's expense, directly from the Keystone Blue Paper Co., 51 North 13th street, Philadelphia 7, Penna. No bids will be received unless bidder is qualified by the Director of Public Works. The questionnaire form with all questions fully answered must be filed with the Director of Public Works at least one week prior to the date of opening bids.

Each bid must be accompanied by security in form and amount as set forth in proposal form.

THOMAS BUCKLEY, Director

OFFICIAL PROPOSALS

Bids: August 25, 1950 (935)

Steel Footwalk Gratings and Steel Supports for Burtoning System

THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY GRAIN TERMINAL
COLUMBIA STREET PIER
CONTRACT GT-18

Sealed proposals for construction of steel footwalk gratings and replacement of steel supports for the burtoning system in the Columbia Street Pier of the Port Authority Grain Terminal, Foot of Columbia Street at Gowanus Bay, Brooklyn, N. Y., will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, N. Y. until 11:45 A. M. Friday, Aug. 25, 1950, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $10 per set. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman.
New York, August 17, 1950

Bids: August 25, 1950 (934)

Fire Curtains

THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY GRAIN TERMINAL
COLUMBIA STREET PIER
CONTRACT GT-17

Sealed proposals for furnishing and installing of fire curtains in the Columbia Street Pier of the Port Authority Grain Terminal, Foot of Columbia Street at Gowanus Bay, Brooklyn, N. Y. will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, N. Y. until 11:30 A. M. Friday, Aug. 25, 1950, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $10 per set. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman.
New York, August 17, 1950

Bids: August 23, 1950 (927)

Furnishing and Delivering Ground Sulfate of Alumina

WASHINGTON SUBURBAN SANITARY COMMISSION

Sealed proposals for furnishing and delivering approximately five-hundred (500) tons of ground sulfate of alumina will be received at the office of the Purchasing Agent, Room 3, of the Washington Suburban Sanitary Commission, Hamilton Street Hyattsville, Maryland, until 10:30 A.M. Wednesday, August 23rd, 1950 at which time and place they will be publicly opened and read.

Specifications may be obtained from W. R. Douglas, Purchasing Agent of the Commission, Hyattsville, Maryland.

Dwight R. Galt, Chairman
Warren Browning
Leland G. Worthington
Commissioners

Bids: August 30, 1950 (925)

Construction of Harbor Project

The Puerto Rico Transportation Authority will receive sealed bids for the construction of Arecibo Harbor Project, Bulkhead Wharf, until 2:00 P.M. (Puerto Rico Time) on the 30th of August of 1950 at San Juan, Puerto Rico, at which time and place all bids will be publicly opened and read aloud.

The successful bidder will be required to furnish satisfactory performance and payment bond or bonds.

Proposal forms and contract documents, including plans and specifications, are on file in the office of the Chief Engineer of the Puerto Rico Transportation Authority, at San Juan, Puerto Rico.

Copies of the documents may be obtained until 48 hours prior to assigned time for opening the bids by depositing $25.00 with the Puerto Rico Transportation Authority for each set of documents so obtained. The amount of the deposit will be refunded to each person who returns the plans and documents in good condition within 10 days after the opening of the bids.

The Puerto Rico Transportation Authority reserves the right to reject any or all bids and waive any informalities in bidding.

A certified check or bank draft payable to the Puerto Rico Transportation Authority, U. S. Government Bonds, or a satisfactory bid bond executed by the bidder and acceptable sureties in an amount equal to (5%) five percent of the bid shall be submitted with each bid.

SALVADOR V. CARO
General Manager

Bids: August 31, 1950 (933)

Expansion of Temporary Terminal Building Phase 2

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CONTRACT NYA-131

Sealed proposals for the construction of Phase 2 of the Expansion of the Temporary Terminal Building at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, N. Y. until 2:00 P. M. Thursday, Aug. 31, 1950, and thereafter in the Auditorium of the Authority at the same address until 2:30 P. M., on the same date, at which latter time and place said proposals will be publicly opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $25 per set. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman.
New York, August 17, 1950

Bids: August 31, 1950 (932)

Fabrication and Installation of Wood Benches with Terrazzo Bases and Wood Benches with Stainless Steel Bases

THE PORT OF NEW YORK AUTHORITY
CONTRACT BT-71

Sealed proposals for the fabrication and installation of wood benches with terrazzo bases and wood benches with stainless steel bases in the Port Authority Bus Terminal, 625 8th Ave., New York, N. Y. will be received at the office of the Director of Purchase of The Port of New York Authority, Room 1402, 111-8th Ave., New York 11, until 11:00 A.M., Thursday, Aug. 31, 1950, at which time and place proposals will be opened and read.

Contract documents may be obtained upon request at the office of the Director of Purchase.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, August 17, 1950

Bids: September 1, 1950 (931)

Installation of Boiler Plant and Rehabilitation of Steam Heating System

THE PORT OF NEW YORK AUTHORITY
CONTRACT C & M 102

Sealed proposals for the Installation of Boiler Plant and Rehabilitation of Steam Heating System, Building No. 104, Port Newark, N. J., will be received at the office of the Director of Purchase of The Port of New York Authority, Room 1402, 111-8th Ave., New York 11, until 11:00 A.M., Friday, Sept. 1, 1950, at which time and place proposals will be opened and read.

Contract documents may be obtained upon request at the office of the Director of Purchase.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, August 17, 1950

(Continued on page 107)

Read the Official Proposal Columns of ENGINEERING NEWS-RECORD This Week and Every Week

OFFICIAL PROPOSALS
(Continued from page 106)

Bids: August 31, 1950 (3511)

Substructure & Superstructure

DELAWARE RIVER
JOINT TOLL BRIDGE COMMISSION

526 Broad Street Bank Building
Trenton 8, New Jersey

NOTICE TO CONTRACTORS

Sealed proposals for the construction of the Delaware River Bridge from Morrisville, Pennsylvania to Trenton, New Jersey will be received by the Delaware River Joint Toll Bridge Commission at its office, 526 Broad Street Bank Building, Trenton 8, New Jersey, until eleven o'clock (11:00) A.M., Eastern Standard Time, on the 31st day of August 1950, at which time and place all bids will be publicly opened and read aloud.

After Monday, July 31, 1950, Instructions to Bidders, form of Proposal, form of Contract, form of Performance Bond, Plans and Specifications may be examined at the office of the Commission, above address, or at the office of the J. E. Greiner Company, 1201 St. Paul Street, Baltimore 2, Maryland, and copies thereof obtained upon payment of $10.00 for each set, which amount is not returnable.

The following are approximate quantities of major items.

Substructure	
Wet and Dry Excavation	11,500 C.Y.
Rock Excavation	1,000 C.Y.
Concrete	11,600 C.Y.
Reinforcing Steel	335,000 Lbs.
Granite Facing	1,900 C.Y.
Superstructure	
Structural Steel	2,300 Tons
Concrete	3,000 C.Y.
Reinforcing Steel	490,000 Lbs.

Bids for the bridge may be submitted for substructure and superstructure separately or as a combined bid.

Each bid must be accompanied by a certified check in the amount of five (5) percent of the total bid price.

All checks shall be made payable to the Delaware River Joint Toll Bridge Commission, which amounts shall be forfeited as liquidated damages if the bidder or bidders fail, within ten (10) consecutive calendar days after written notice that the bidder or bidders have been Awarded the contract, to enter into a written contract with the Commission in accordance with the accepted bid, and to give a Performance Bond satisfactory to the Commission, equal to one hundred percent (100%) of total amount of contract.

The Commission reserves the right to waive any informalities in the bids received, to reject any or all bids; and to award the contract only to those experienced in this class of work, and to the bidder whose proposal is deemed by the Commission to be most advantageous to the public interest.

DELAWARE RIVER
TOLL BRIDGE COMMISSION
By: Alexander R. Miller
Chairman of Commission

Date July 31, 1950

U. S. Government

Department of Commerce, Bureau of Public Roads, August 2, 1950. SEALED BIDS will be received at the office of the Division Engineer, Bureau of Public Roads, 7410 Colonial Pike, Arlington, Virginia, until 10:00 a.m., E.S.T., September 7, 1950, for Project 1042, Colonial Parkway, James City County, Virginia, Trestle Bridge over Powhatan Creek. Length 0.137 mile. The approximate quantities of the more important items are 1,850 cu. yd. Cement Concrete, 300,000 lb. Reinforcing Steel and 16,000 lin. ft. Precast Concrete Piling. Minimum wage rates have been fixed as required by law. For plans and specifications, a deposit of $10.00 cash or CERTIFIED check made payable to the Treasurer of the United States, will be required to insure their return within 15 days after the opening of bids. Plans, specifications and Proposal forms may be obtained at the address given above. H. J. Spellman, Division Engineer. (3501)

READ THE OFFICIAL
PROPOSAL COLUMNS OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

Bids: August 23, 1950 (3517)

State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time on Wednesday, August 23, 1950 by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects. Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for plans and proposal forms for each contract is indicated below. A refund will be made in full to bidders for the return of one set in good condition within 20 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1 G. L. Nickerson, Dist. Engr., 333 Broadway, Albany, N. Y.				
Albany, Columbia, Greene, Rensselaer, Saratoga, Schenectady	R.C. 50-36	Seven Projects in Dist. 1	25.54	Waterproofing Pavt.	$800 Plans $10	$14,000
		DISTRICT No. 2 J. Ketchum, Dist. Engr., 109 No. Genesee St., Utica, N. Y.				
Herkimer, Madison, Montgomery, Oneida	R.C. 50-37	Eight Projects in Dist. 2	27.88	Waterproofing Pavt.	$800 Plans $10	$14,000
		DISTRICT No. 3 Wm. Robinson, Dist. Engr., 401 E. Water St., Syracuse, N. Y.				
Cayuga, Monroe, Onondaga, Oswego, Wayne	R.C. 50-42	Ten Projects in Dist. 3	42.26	Waterproofing Pavt.	$800 Plans $10	$14,000
		DISTRICT No. 4 A. R. Mellroth, Dist. Engr., Barge Canal Terminal, Rochester, N. Y.				
Genesee, Livingston, Monroe, Ontario, Wyoming	R.C. 50-38	Eight Projects in Dist. 4	32.56	Waterproofing Pavt.	$1,000 Plans $10	$17,000
		DISTRICT No. 7 R. F. Hall, Dist. Engr., 484 Washington St., Watertown, N. Y.				
Jefferson, Lewis	R.C. 50-39	Six Projects in Dist. 7	6.11	Waterproofing Pavt.	$140 Plans $10	$2,500
		DISTRICT No. 8 J. S. Bixby, Dist. Engr., Pleasant Valley Road, Poughkeepsie, N. Y.				
Orange, Putnam, Rockland, Ulster, Westchester	R.C. 50-40	Twenty Projects in Dist. 8	21.67	Waterproofing Pavt.	$500 Plans $10	$9,000
		DISTRICT No. 9 F. W. Donovan, Dist. Engr., 71 Frederick St., Binghamton, N. Y.				
Broome, Chenango, Delaware, Otsego, Schoharie, Tioga	R.C. 50-41	Seven Projects in Dist. 9	26.46	Waterproofing Pavt.	$700 Plans $10	$12,000
		DISTRICT No. 2 L. Ketchum, Dist. Engr., 109 No. Genesee St., Utica, N. Y.				
Oneida	FARC 50-44 FAC 50-9	Rome-Taberg, S. H. 563 Rome West Artery (Armstrong Av.-W. Whitesboro St.-Black River Blvd.) Proj. I 635-3)	2.46	Aspl. Conc. Type 1A, Opt. Conc. Bridge 20' Span	$80,000 Plans $50	$1,428,000
		DISTRICT No. 5 C. R. Waters, Dist. Engr., 65 Court St., Buffalo, N. Y.				
Erie	FAC 50-8	Main Street-Humboldt Parkway Underpass; City of Buffalo Proj. U 1087.1)	0.63	Aspl. Conc. Type 2A—0.51 mi. Misc. Work—0.12 mi. 2 Sp. Alpha I-Beam 56'-6" Ea. 2 Sp. Alpha I-Beam 87' Ea. Alpha Royalty $776.10	$120,000 Plans $50	$2,289,000
		DISTRICT No. 6 B. F. Bateau, Dist. Engr., 30 W. Main St., Hornell, N. Y.				
Chemung	FASS 50-5	Bowman Hill Rd.-Shappee Bridge, Co. Rd. 20 Proj. No. S 256-1)	0.17	Aspl. Conc. Type 1A, Opt. 87 Alpha I-Beam Alpha Royalty—$105.72	$5,000 Plans $10	$85,000
		DISTRICT No. 8 J. S. Bixby, Dist. Engr., Pleasant Valley Rd., Poughkeepsie, N. Y.				
Ulster	RC 50-43	Ulster-Delaware, Pt. 1, S. H. 16 Ulster-Delaware, Pt. 2, S. H. 117	0.33	Aspl. Conc. Type 1A, Opt.—0.23 mi. Aspl. Conc. Type 1A, Opt. Widening—0.04 mi. Misc. Work—0.06 mi.	$1,500 Plans $10	$80,000
		DISTRICT No. 10 J. J. Darcy, Dist. Engr., Montauk Hwy. at Little E. Neck Rd., Babylon, L. I., N. Y.				
Bronx	FA BRF50-5	Bronx River Parkway So. Ext. Fed. Res. Br. & BGW Proj. 1929-11)	0.04	Steel Beam Bridge 2 Spans 26'-11" Ea.	$1,000 Plans $10	$54,000
Nassau	NSP50-1	Northern State Parkway and Access Roads	6.94	Traffic Divider—6.65 mi. Resurf. access rds.—0.29 mi.	$4,000 Plans $25	$148,000
Queens	C50-10	North Conduit Ave. (258) Place to Brookville Blvd.)	0.68	Aspl. Conc. Type 1A, Opt.	$5,500 Plans $10	$98,000
Suffolk	N. SAG. S. P. 50-2	Northern State Parkway	8.85	Grad. Proj. 4.02 mi. Acces. Rd. 4.4 4.83 mi. 3.57 mi. Grad. 1.26 mi. 9 Conc. Conc. Rg. Fr. 52-0" 3 Conc. Rg. Fr. 52-0" 3 Steel Stringers, Composite 4 Span Total 229'-11" Alpha Royalty $430	$40,000 Plans $100	$1,588,000

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by a draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders".

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

P. D. TALLAMY
SUPT. OF PUBLIC WORKS
(Continued on page 108)

OFFICIAL PROPOSALS
(Continued from page 107)

Bids: September 18, 1950 (926)

Sanitary Sewerage System

EWING-LAWRENCE SEWERAGE AUTHORITY

Sealed bids will be received by the Ewing-Lawrence Sewerage Authority, 156 State Street, Trenton, New Jersey, until 2 o'clock P.M. September 18, 1950 at the Lawrence Township Hall for construction of a sanitary sewerage system in Ewing and Lawrence Townships, Mercer County, New Jersey.

The work to be done includes furnishing the materials and performing the labor for constructing approximately 2,900 feet of 36 inch, 1,400 feet of 33 inch, 7,500 feet of 30 inch, 20,600 feet of 27 inch, 1,800 feet of 24 inch, 3,500 feet of 18 inch, 3,300 feet of 15 inch, 15,000 feet of 12 inch, 30,700 feet of 10 inch and 250,100 feet of 8 inch gravity sewers, 5,500 feet of 6 inch pressure sewers and 43,100 feet of 6 inch house connections. The work is divided into four sections under which it is classified according to its character and location. Bidders will be allowed to bid on one or more sections or on a combination of sections.

Copies of the plans and specifications may be examined and obtained at the office of the Authority or at the office of Buck, Seifert and Jost, Consulting Engineers, 112 East 19th Street, New York 3, N.Y. upon deposit of Fifty Dollars, which will be refunded upon return of the plans and specifications in good condition within 20 days after the date on which bids are received.

Each proposal must be accompanied by a certified check or bid bond from a surety company authorized to do business in New Jersey and satisfactory to the Authority in amount equal to ten percent of the proposal, and by an agreement in writing from a qualified surety company binding the surety to execute the required performance bond in the event the bidder is awarded the contract.

The Authority reserves the right to consider bids for 30 days after their receipt before awarding any contract and to accept any bid or reject any or all of them.

EWING-LAWRENCE SEWERAGE AUTHORITY
By WILFRED F. PREDHOME
Secretary

Bids: August 29, 1950 (924)

Port Jervis Sewerage System

PLUMBING, GAS FITTING, HEATING AND VENTILATING EQUIPMENT CONTRACTS 424 and 425

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 10:00 A.M., Eastern Standard Time, on Tuesday, August 29, 1950, for Contracts 424 and 425, for furnishing, delivering, installing and testing plumbing, gas fitting, heating and ventilating equipment for the sewage treatment plant and pumping stations of the Port Jervis sewerage system, in the City of Port Jervis, Orange county, New York, all as set forth in the specifications. Contract 424 will comprise plumbing equipment for the North street and Neversink pumping stations and plumbing and gas fitting equipment for the sewage treatment plant. Contract 425 will comprise heating and ventilating equipment for the two pumping stations and the sewage treatment plant.

Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., of each contract can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of $5.00 in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of each deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President. RUFUS E. McGAHEN, JAMES J. MORAN, Commissioners, Board of Water Supply. RICHARD H. BURKE, Secretary.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: "OPPORTUNITIES" :EQUIPMENT :USED OR RESALE

ESTIMATOR or COST ENGINEER

wanted for work in Brazil Age 28 to 40. By North American Company which has been building hydro-electric projects in Brazil for past 50 years. First class engineering and construction organization with good opportunities for future. Salary to suit qualifications. In reply state experience and personal status in detail. Reply to

Dept. WHK
Canadian Brazilian Services, Ltd.
Yonge & Gerrard Sts.
Toronto, Ontario, Canada

ESTIMATOR

Experienced ENGINEER, familiar with Oil Refinery design and capable of estimating process equipment from flow diagrams.

Give full information, experience record and salary expected.

ARTHUR G. McKEE & CO.
2300 CHESTER AVE.
CLEVELAND 1, OHIO

SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered until present position protected. Send only name and address for details.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N.Y.

ADMINISTRATIVE ENGINEER WANTED

The Council of the Village of Richfield, Hennepin County, State of Minnesota, will receive written applications and qualifications for full time engineer in said Village until 8:00 P.M. Monday, September 25, 1950.

Applicants should appear in person at stated time for interview with the Council.

GEORGE SOBERG, Clerk, Village of Richfield

REPLIES (Box No.) Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

CIVIL SERVICE

DAM DESIGN and Construction Engineer $6,772 to $7,908. 5 yrs. responsible hydraulic experience including 2 in design of construction on major dam and bachelors plus college degree in civil engineering. Eligible for California civil engineering license. Applicants should be registered in home State. Apply on official form by Sept. 19 with State at once for details to State Personnel Board, Dept. C, 1015 L Street, Sacramento, California.

POSITIONS VACANT

WANTED, SEVERAL engineering graduates, under 35, by large industrial fire prevention organization for field work involving periodic inspections and special consulting service. Electrical and Chemical engineers preferred. Permanent openings in United States and Canada. P-7287, Engineering News-Record.

CONSTRUCTION COMPANY operating nationwide specializing in structural concrete, such as bridge piers and their foundations and mass concrete such as dams. Must have thoroughly experienced estimator familiar with present-day costs capable of preparing comprehensive and complete estimates. To be considered, complete information must be furnished. Only those who have been advised of this advertisement. P-6974, Engineering News-Record.

DESIGNING ENGINEER experienced in steel and concrete bridges and structures. Must be capable of assuming responsibility. Salary and bonus. Submit complete data on education and experience. P-7191, Engineering News-Record.

WANTED: EXPERIENCED Superintendent on residential and commercial construction work. Reply Robert E. Dorenkotter, Inc., 311 E. Post Rd., Mamaroneck, N. Y.

WANTED: ENGINEER for contractor engaged in Foundation Work—must have experience in all types of pile foundations and heavy construction, including estimating and sales experience. State age and salary desired. P-7425, Engineering News-Record.

MALE HELP Wanted—Civil Engineer, registered, wanted immediately for general construction of highways, airports, dams and drainage projects. One experienced in estimating and project management. Guaranteed salary and percentage of job. Long term opportunity for right party. Must be a engineer. Reply to P-7412, Engineering News-Record.

MALE HELP Wanted—Wanted immediately, foreman for large sewer and tunnel projects. Must be first class. Long term job. Reply to P-7411, Engineering News-Record.

POSITIONS VACANT

STRUCTURAL ENGINEER—Immediate position with upstate N.Y. Fabricating Firm for high quality, top experienced man capable of designing structural steel, preparing shop details, managing and operating structural drafting room. In answer state age, qualifications and experience. Reply to P-7410, Engineering News-Record.

ENGINEER, CIVIL, experienced in drafting, quantity estimating, surveying and construction supervision. First class man only. Write 5910 MacArthur Blvd., Washington, D. C.

CONSTRUCTION SUPERINTENDENT experienced in structural concrete, pile driving, and excavation work. Good opportunity for right man. P-7400, Engineering News-Record.

POSITIONS WANTED

CIVIL ENGINEER, registered P.E. N.Y. Thirty years executive experience on general construction, highways, airports, municipal improvements, buildings, including 9½ years foreign assignments. Fluent Spanish. Retired (60) from U. S. Engineers. Would consider position as Resident Engineer or Foreign contract Representative. Location immaterial. Resume, references, credentials. Present employ located New York City. PW-6824, Engineering News-Record.

MASTER MECHANIC, Equipment Supt., Mechanical Operating Engineer, over twenty's line of experience, in repair, operation and maintenance of heavy industrial, power house, pumping stations and marine equipment. Desires permanent position. PW-7224, Engineering News-Record.

ESTIMATOR-MANAGER-engineer, 14 years experience on heavy engineered construction; multi residential, public commercial & industrial building. Prefers position with contractor handling all types of heavy const. & bldg. construction. In reply state salary to be expected. PW-7308, Engineering News-Record.

CONSTRUCTION MANAGER, Project Manager-Graduate C.E., P.E., with 20 years experience in all phases of construction work, estimating, purchasing, field supervision. Broad experience on Heavy, General Building and Industrial Plant Construction. Excellent record and references. Permanent connection desired. Available Sept. 1st. Salary $12,000. PW-7292, Engineering News-Record.

CIVIL ENGINEER 20 years engineering experience, design, construction and supervision, in roads, streets, bridges, sewers, etc., desires a change in employment. PW-7264, Engineering News-Record.

STRUCTURAL ENGINEER, B.S. in C.E. and M.S. degree in structural engineering from a well recognized Univ. One and a half years experience in bridges, bldg. design and constr. Good references, age 25, single, available soon. PW-7386, Engineering News-Record.

THE AUSTIN COMPANY

Invites Applications From Capable Engineers and Draftsmen

Opportunities are being offered to Engineers and Draftsmen who can design and or prepare engineering drawings for industrial buildings and their facilities. Assignments are not for specific projects but are in our regular engineering staffs in long-established offices located on the East Coast, Central West, Gulf Coast, and West Coast. Good working conditions. Established vacation and sick leave plans, also paid holidays.

Positions are open to men possessing a sound background of education and experience and qualifying in—

DESIGNERS—Office buildings, laboratories, and industrial buildings. Positions require those possessing vision and creativeness.

STRUCTURAL—Industrial buildings and miscellaneous structures of steel and reinforced concrete.

MECHANICAL—Heating, air conditioning, ventilation systems, process piping, conveying systems, plumbing, sewer, and sprinkler systems.

ELECTRICAL—Industrial lighting and power distribution, and controls.

DETAILERS—Draftsmen experienced in the preparation of steel details for shop fabrication of industrial building frameworks.

Full particulars as to education, experience, and compensation desired should be given in first letter.

NATIONAL HEADQUARTERS

16112 Euclid Avenue — Cleveland 12, Ohio

POSITIONS WANTED

GRADUATE CIVIL Engineer, P.E. 28, married, 4 years experience in construction and layout duties with U. S. Govt., desires field or office position with reliable and progressive firm engaged in heavy construction. Prefer Southwest or Rocky Mountain States. Available after Sept. 15. PW-7295, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT and Engineer desires work in New England. Experienced industrial plants, housing, roads, sewers, docks, bridges, skilled estimator. PW-7305, Engineering News-Record.

STRUCTURAL DESIGNER-DRAFTSMAN. Age 29, married, seven years supervision and design of structural steel and reinforced concrete buildings and bridges. PW-7309, Engineering News-Record.

DRAFTSMAN STRUCTURAL experienced on steel, concrete and timber, also layout work, desires permanent position in Chicago, Illinois. Telephone Bishop 7-5968.

CIVIL ENGINEER, age 34, married, Reg. P.E. New York State, 12 years experience on construction and industrial design duties as engineering work, design or construction. PW-7441, Engineering News-Record.

CONST. SUPT.—Reg. Pro. Eng. Just completed job in S.A. Desires work S.A. or Alaska—6 yrs. foreign exper.—will go anywhere. 20 yrs. resp. admin. and direct field supervision reinforced concrete structures, buildings, reservoirs, airports, docks, bridges. Age 41, good health. Most references. Presently in Chicago. PW-7439, Engineering News-Record.

PART TIME WORK WANTED

ENGINEER SKILLED street Designer. Knows const. methods, costs and contracting, seeks part time. Registered. 4 states.—Month of years' work. Box 862, Philadelphia 5, Pa.

STRUCTURAL DESIGNER, licensed P.E., 25 years experience bridges, industrial buildings, mercantile structures, wants free lance work, design, layout, investigations and estimates. PTWW-7075, Engineering News-Record.

BUILDING CONSTRUCTION Executive, free to devote important but substantial part time to aid in management and expansion of growing concern; long experience field and office. N.Y. vicinity. PTWW-7445, Engineering News-Record.

PROJECT ENGINEER

Wanted — Experienced Construction Engineer for large turbo-generator power plant on East Coast. Must have recent experience in directing operations for complete project, with knowledge of sub-aqueous operations and construction of docks and waterfront facilities. Write giving full particulars of education, experience and salary expected.

P-7108, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

CONSTRUCTION SUPERINTENDENT

WANTED by large company. Technical graduate, experienced in building & equipment installation. Chemical plant experience preferred. Man must be free to travel U. S. Give age, education, detailed experience, & salary expected. Write

Box EN 1190, 221 W. 41 St., N. Y. C.

CONTRACTORS ENGINEER

Gen. Contr. seeks young engineer with well rounded education and background 1 to 5 yrs. exp. for field and office work. Young man with ambition meriting advancement and a natural aptitude for contracting on gen. bldg. const. work. West. Penna. Reply

P-7191, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

ESTIMATOR WANTED

Experienced estimator for established construction firm in Boston. Must be capable of making complete estimates on all types of buildings and qualified to prepare quantity surveys for concrete, masonry, carpentry, excavation, etc. Give full information regarding age, qualifications, experience, salary expected, and date available. All replies confidential.

P-7319, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

ESTIMATORS

Fully experienced in construction and capable of estimating building work, mechanical (machinery, equipment, piping, etc.) or electrical installations. Degree in civil, mechanical or electrical engineering preferred but not necessary.

Openings in Cleveland Office offers lengthy employment with good salary for those qualifying.

Send complete resume stating experience, education, salary requirements and available date to:

THE H. K. FERGUSON COMPANY
Engineers and Builders
Ferguson Building, 1783 East 11th Street
Cleveland 14, Ohio

DISTRICT SALES ENGINEERS

Large mid-west manufacturer requires experienced men with proven sales records in earth moving equipment. Locations in eastern seaboard and mid-west. Submit complete data on education and experience. Excellent opportunity for top-rate men. Salary and commission. Our organization has been advised of this advertisement.

SW-7276, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Fortieth Year

OUR COURSES HAVE HELPED THOUSANDS
to better positions and to pass State Board Examinations

- Complete Structural Engineering Course.
- Public Works Structures.
- Architectural Engineering.
- Special Course C (State Board Exams).
- Reinforced Concrete Engineering.
- Structural Steel Designing.

Monthly payments permissible. Information sent without obligation. WRITE TODAY

WILSON ENGINEERING CORPORATION

College House Offices • Harvard Square • Cambridge, Mass., U. S. A.

LEARN TO ESTIMATE

Today, more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

The **Tamblyn System of Estimating** will make a real estimator out of you in a few weeks of your spare time. We are so sure that you will want to learn it, that we will send you our complete home study course for ten days examination absolutely free. If you don't think it is the finest thing you ever saw, just return it and it won't cost you a cent. If you like it and want it, send us $8.75 when 10 days are up and $7.50 per month until $38.75 is paid.

This estimating system is based on forty years of actual construction experience. It has been sold all over the world for more than twenty years. Thousands of estimators and contractors swear by it. Our offer isn't hot air and big talk. We don't give you a diploma or a lapel button, but we do teach you down to earth estimating which will bring you profitable business.

Just send your name and address today, and we will mail you the complete course at once for your approval.

TAMBLYN SYSTEM

11-15 So. Pearl St. E-442

Denver, Colo.

Building Construction Cost Data

1950 (8th) Edition

A 92-page booklet of tabulated construction costs revised as of January 1950. 1500 items alphabetically arranged and broken down for labor and material. Concise. Comprehensive. *Up-to-date, Handy.* $2.50 Postpaid.

R. S. MEANS

P. O. Box 62N Duxbury, Mass.

WANTED SUB-CONTRACTS

For structural steel and reinforced concrete design or steel detailing, by Midwest Consulting Engineering Firm. Work to be done in our offices.

CW-7421, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

ESTIMATING SERVICE

Any Trade and Type of Project

Literature and Sample on request

Construction Survey Cooperative
101 Park Ave., New York 17, N. Y.
MUrray Hill 5-7317 Founded 1922

SUBMERGED PIPE LINE CONSTRUCTION

BOYCE COMPANY

Phone 3-2530 Clearwater, Fla.

PATENT ATTORNEY

Patent Practice

before U. S. Patent Office. Validity and infringement investigations and opinions. Books free and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 333, 815-15th Street, N. W., Washington 5, D. C.

New "SEARCHLIGHT" Advertisements received by August 21st will appear in the August 31st issue, subject to space limitations.

Classified Advertising Division
ENGINEERING NEWS-RECORD
330 W. 42nd St., New York 18, N. Y.

SELLING OPPORTUNITIES WANTED

WANTED YOUNG Company in the Construction Machinery business looking for connection as Factory Representative in Midwest working out of Detroit, Michigan. RA-7358, Engineering News-Record.

SALES ACCOUNTS Wanted. Previous experience sales steel building accessories, fencing, etc. Capable estimator, graduate civil engineer. P. O. Box 1441, Columbia, S. C.

FOR SALE

Must Sell

One 1948 Jet Crete Cement Gun. No reasonable offer refused. Call Hack, New Jersey, 2-4421 M

WANTED

WANTED TO BUY

8 or 10 in. Suction Dredge

Shallow Draft, complete with accessories.

Write HUDGINS & ALFONSO, Inc.
Ramrod Key P. O., Florida

WANTED

¾ Yd Lima Model 34, Diesel Crane
1½ Yd Steam Crawler Crane
Material Bins and Cement Bins
Locomotives and Locomotive Cranes
Crawler and Gantry Cranes

STONE THE CRANE MAN
1132 Prudential Bldg., Buffalo, N. Y.

WE BUY OR SELL
All Types of
TRENCHING MACHINES

AIR COMPRESSOR RENTAL CO.
19615 NOTTINGHAM RD. CLEVELAND
Kenmore 1-8000

WANTED

Used Cleveland or Buckeye Trencher

CARTER CONSTRUCTION CO.
GENEVA, ALABAMA

EQUIPMENT WANTED IMMEDIATELY

BACK HOE ATTACHMENTS for the following machines:
Lorain 82
Bucyrus-Erie 37B or Manitowoc 3000A
Lima, model 34.

Telephone or write

TESTA BROS., INC.
925 Citizens Bldg. Cleveland 14, Ohio
TOwer 1-0558

WANTED

STANDARD BASE

for No. 1 Vulcan Steam Hammer.

REV-LYN CONTRACTING CO.
9 Hudson St. Lynn, Mass.
Telephone LYnn 3-7726

FOR SALE

(Additional for sale ads continued on page 111)

FOR SALE — FOR RE-ERECTION

Several one story heavy steel frame buildings with overhead cranes, wide spans, up to 100,000 sq. ft. or larger; match-marked for re-erection by us anywhere if desired.

Immediate Delivery

H. JAFFE

50 Church St., N. Y. 7, N. Y.
Phone Beekman 3-1176

FOR SALE OR RENT

4 DW 10s; 4 D-8s with Bulldozers: 200 Cement Bin: 200 ton Aggregate Bin: 604 Lima Shovel with Backhoe.

JOHN B. SCHULTZ CONTR. Co., Inc.
316 Crestwood Ave. Buffalo 16, N. Y.
Phone Delaware 8011

L.B.SMITH INC.

OFFERS

AIR COMPRESSORS

Ingersoll-Rand 105 cubic foot, Waukesha gasoline power, on two rubber tires.
Gardner-Denver 105 cubic foot with air receiver, hose reel, driven by power take-off and mounted on 1941 Ford.
Gardner-Denver air-cooled 105 cubic foot with air receiver, V-belt drive from power take-off and mounted on 1942 Ford chassis with Wood two-yard dump body.
LeRoi 2-stage 105 cubic foot air-cooled, skid mounted, built-in tool boxes, hose reels and hose.
Gardner-Denver two-stage 160 cubic foot skid mounted.
Schramm 210 cubic foot with International UD14 diesel on steel wheels.
Worthington 210 cubic foot, two-stage, air-cooled, on steel wheels with Hercules diesel.
Gardner-Denver 315 cubic foot two-stage, skid mounted, Murphy four-cylinder diesel.
Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven 50 HP slip ring motor.
Worthington two-stage, water-cooled, vertical 250 cu., 60 CFM, new condition.

QUARRY EQUIPMENT & BINS

Cedarapids BBB 1036 Scalper.
10 x 20 Beaumont jaw crusher.
10 x 7 Allis Chalmers Blake type jaw crusher.
Cedarapids No. 1 Kubit.
60 ton 2 compartment storage bin with clam shell gates.
New 16 x 16 double clamshell gates.
20" x 6'6" Belt Type Magnetic Separator.
Conveyors—18"—24"—30"—36".
2—4' x 12' Tyler F660 screens.
Cedarapids portable screening plant.

TRUCKS—TRAILERS

1½ ton Ford & Chevrolet.
2½ ton GMC, New and rebuilt.
Sterling COE Model 255GCS tandem drive tractor 9.00x24 tires, 200 HP Cummins supercharged diesel, complete with 40-ton Rogers low bed equipment trailer, 16—7.50x20 tires, air-brakes, outriggers, excellent condition.
2,000 gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.

GENERATORS & LIGHT PLANTS

1½ KW to 125 KW, alternating and direct current, gasoline and diesel powered.

GASOLINE AND DIESEL ENGINES

New JXD Hercules Gasoline.
Buda, Hercules, Hill diesels, rebuilt.
New and rebuilt Murphy diesels.
GM 6 and 12 cylinder diesels, practically new.

SHOVELS—CRANES

Lorain 75B, 1¼ yd. shovel, gas power
Marion 25-ton diesel powered heavy duty truck crane on heavily reinforced Mack.
P&H Model 625A 15-ton crawler crane.
Brownhoist 1 yd. gas shovel and crane.
Lorain 30 combination ½ yd. shovel, hoe & clam.
Universal truck crane.

SHOVEL & CRANE ATTACHMENTS

Lorain 75B-77 1½ yd shovel attachment rebuilt.
P&H 203 shovel attachment.
Chain crowd Lorain 30A shovel attachment.
Lorain 40 Hi-Lift shovel attachment.
Bucyrus-Erie 30B tunnel front attachment.
Koehring 301 dragline fairlead.
50' crane clam boom, 1¼ or 1½ yd.
Lorain 75 fairlead.

Backhoe Buckets & Attachments

¾ yd Lorain, 40, LBS =6105, 44" cutting width, teeth, sheave.
27" outside width drop bottom type LBS =1033, good condition.
26" outside width solid bottom type LBS =4377, good condition.
¾ yd Amsco 40" cutting width, LBS =8101.

CLAM—DRAG—SCRAPER BUCKETS

NEW TAGLINES

McCaffrey Model 648 for 1¼ to 2-yd crane.
McCaffrey Model 636 for ¾ yd to 1-yd crane.

SHOVEL DIPPERS

Lorain 41, ¾-yd. LBS =7433, rebuilt.
New Lima 1-yd. Amsco. LBS =2295.
Bucyrus-Erie 1¼ yd gas air, LBS =3782, fair.
Lorain 75 manganese 1¼-yd, LBS =7233, teeth and bail.
Lorain 75B, 1¼-yd extended lip, 1¾-yd LBS =2260.
Pettibone-Mulliken 2-yd Lorain 82 or 820, manganese, LBS =5361.
Pettibone-Mulliken 2-yd for 3500 Manitowac LBS =5763.

CONCRETE ROAD BUILDING & MISCELLANEOUS CONCRETE HANDLING EQUIPMENT

Pavers & Mixers

27E Koehring Paver.

Concrete Finishers

Jaeger type "L" double screed, 10½'-12½', rebuilt.
Heltzel 10'-12' finisher, rebuilt.
Blaw-Knox gas-electric 10½'-12½', rebuilt.
2 Koehring 10'-12', rebuilt.

Concrete Road Forms

830'—Truscon 7"x8" forms, with stakes.
1380'—Heltzel 7"x8" forms, with stakes.
4050'—Heltzel 9"x8" forms with stakes.
1430'—Heltzel 10"x8" forms, with stakes.
1010'—Blaw-Knox 10"x8" forms, with stakes.

Fine Grade Machines

Flynn surgrader 10'-12', rebuilt.
R.B. Fine Grader for 21' width, rebuilt.

Form Graders—2 of each

Cleveland formgrader, new condition.
Carr formgrader, new 1944, rebuilt.

Barber-Greene 44C Trenching Machine

ROLLERS

Hercules 9-11 ton, three-wheel.
Buffalo-Springfield 10-ton, three-wheel.

GRADERS

New Warco D76 tandem driven grader, 12' blade, V-type scarifier, 13.00x24 tires all around, 24,500 lbs., International UD14A diesel engine.

TRACTORS

FD Cletrac crawler tractor, Buckeye bulldozer & double drum power control unit, DHXB Hercules diesel engine. Rebuilt, immediate delivery.
International TD-9 with Bucyrus-Erie angle-dozer.
Minn-Moline UTI wheel type, gas powered with Lull front end shovel loader.

Phone HARRISBURG, PA. 7-3431

LASTING • BONAFIDE • SERVICE — L.B. SMITH, INC.

L.B.SMITH INC. CAMP HILL, PA. SUBURB OF HARRISBURG

WE OWN THE EQUIPMENT WE ADVERTISE

DIESEL POWER

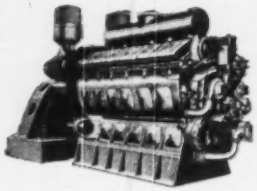
FOR

IMMEDIATE SHIPMENT

UNIT CAPACITIES—10 TO 1875 KVA

A.C.—50 AND 60 CYCLES

VARIOUS VOLTAGE



A PARTIAL LISTING OF OUR INVENTORY

KVA	Make	Model	HP	RPM	KVA	Make	Model	HP	RPM
1875	Fairbanks Morse	31F16	2000	300	375	Enterprise	HSE-6	450	450
1420	Fairbanks Morse	38D8¼	1600	720	330	Superior	KNA	396	514
1250	General Motors	16-278A	1600	720	312	General Motors	8-268A	450	1200
937.5	General Motors	12-567	1000	720	312	Clark	M164	375	527
625	Alco	6-12½x13T	750	600	125	General Motors	3-268A	150	1200
425	Baldwin	VO-6	510	450	75	General Motors	6043C	90	1200
400	Buckeye	80	480	600	62.5	Int'l Harvester	UD-18	76	1200

D.C. UNITS ALSO AVAILABLE

A. G. SCHOONMAKER COMPANY, INC.

DIESEL DIVISION, 50 CHURCH ST., NEW YORK 7, N. Y.

GOOD USED EQUIPMENT

OSGOOD—½ yd. Backhoe

CLETRAC—Model DD Diesel Bulldozer

CATERPILLAR—Model D4 Bulldozer

CATERPILLAR—Model D2 Traxcavator

ALLIS-CHALMERS—Model K Bulldozer

LITTLEFORD—2½ ton Roller

R. B. WING & SON CORP.

384 BROADWAY, ALBANY, N. Y.

Phone 3-4161

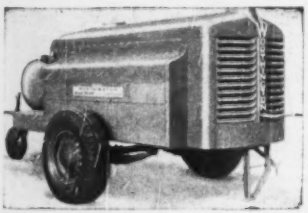
PORTABLE COMPRESSORS

Sales—Rental

Rental Purchase

30 CFM WORTHINGTON (Gas) 2 Pneu
60 CFM INGERSOLL (Gas) 2 Pneu
60 CFM CHICAGO (Gas) Skids—2 Pneu
85 CFM INGERSOLL (Gas) 2 Pneu
105 CFM WORTHINGTON (Gas & Diesel)
105 CFM INGERSOLL (Gas) 2 & 4 Pneu
160 CFM INGERSOLL 4 Pneu
210 CFM GARDNER DENVER (Gas) 4 Pneu
210 CFM WORTHINGTON (Gas & Diesel) 4 Pneu
315 CFM LeROI (Gas) 4 Pneu
315 CFM INGERSOLL (Diesel) 4 Pneu
315 CFM WORTHINGTON (Gas & Diesel) 4 Pneu
500 CFM WORTHINGTON (Diesel) 4 Pneu

STATIONARY COMPRESSORS
FOR RENT
ELECTRIC - STEAM - GAS



American Air Compressor Corp.

Dell Ave. & 48th St., North Bergen, N. J.

SINCE 1902

DRAGLINES - SHOVELS

9-W Bucyrus-Erie Electric Dragline; 200' boom, 8 yd. bucket, individually driven, regenerative drum sets. Machine like new. Pa. location.

170-B Bucyrus-Erie Electric 6 yard Shovel.

Model 621-S Page Diesel Dragline; 125' boom, 7 yd. bucket.

Model 618 Page Diesel Dragline; 110' boom, 5 yd. bucket.

4161 Marion Electric Dragline; 110' boom, 4 yd. bucket.

1201 Lima Shovel; 32' boom, 22' stick, 3½ yd. dipper; Cummins diesel engine.

54-B Bucyrus-Erie Dragline; 90' boom, 2½ yd. bucket; Buda diesel engine.

3500 Manitowoc Dragline; 85' boom, 2½ yd. bucket; Caterpillar engine.

802 Lima Dragline; 75' boom, 2½ yd. bucket; Hesselman engine.

37-B Bucyrus-Erie combination 1½ yd. Shovel & Dragline.

FRANK SWABB EQUIPMENT CO., INC.

Hazelton Nat'l Bank Building

HAZLETON, PA.—Telephone 4910

FOR SALE

1—N. W. SHOVEL

¾ c.y. Model 25
Optional as Crane or Backhoe

WILLIAMS CONSTRUCTION CO.

Box 145 Middle River, Baltimore 20, Md.
Phone—Essex 1310

SALE OR RENT

1—D4 Traxcavator
1—6 Ton Huber 3W Diesel Roller.
1—Lima 34 Truck Crane 80' Boom.
1—Koehring 304 Diesel S.C. & Bhoe.
1—American 6-85 Revolver 90' B.3/60/440V.
1—45' Crane Boom for Link Belt LS90.
1—5 Ton Wright 3 motor AC Floor Operated, Underhung Travelling Crane. 21'4" Span.
1—30 Ton Plymouth Std. Ga. Diesel Loco.
1—40 Ton Orton Diesel Loco. Crane.
1—30 Ton Browning Steam Loco. Crane.

B. M. WEISS CO.

Girard Trust Co. Bldg. Phila. 2, Pa.
Rittenhouse 6-2311

FOR RENT

1201 Lima dragline with 60 foot boom—5 cu.yd. bucket up to 100 foot boom—3¼ cu. yd. bucket

2 D-8 Caterpillar Bulldozers

1 D-7 Caterpillar Bulldozer

INLAND CONSTRUCTION CO., INC.
P. O. Box 507 Rosedale, Miss.

DERRICK

1—Lambert Steel Guy Derrick, 3-section mast 115', 3-section boom 100', with 20' Steel Built Wheel, Front Block and Spider. Capacity: 10 Ton Flat Boom, 20-Ton 50' Radius.

ABERTHAW COMPANY

133 Southampton St. Boston 18, Mass.

FOR SALE

Bucyrus Erie, 41-B, steam crane 100' stationary belt conveyor Backhoe boom for Bay City ¾ yd.

The STONE EQUIPMENT Co.

10038 W. Jefferson Ave. River Rouge, Michigan

For Rent

SPEEDCRANES

LATE MODELS

Manitowoc Diesel Powered Speedcranes for rent. 25, 40 and 60 ton capacities with booms 100' or more, 20' and 30' jibs. Special price on long rentals.

FORSYTHE EQUIPMENT CO., INC.

37-11 Vernon Blvd. Long Island City, New York
Tel. STillwell 4-1030

RENT WITH PURCHASE OPTION
PAVING EQUIPMENT
EXCAVATING EQUIPMENT

Forms, Bins, Finishers, Spreaders, Pavers, etc.
Tournapulls—Scrapers—Tournadozers, etc.

DRAVO-DOYLE CO., Pittsburgh, Pa.

ROAD & CURB FORMS

Blaw-Knox 8000 ft. 9"x9".
Blaw-Knox 10000 ft. 8"x8". NEW.
3000' Metaform Curb Forms 13½" hi, 10'.

ROAD ROLLERS

B-S 10 ton 3 wheel VM-31.
B-S tandem 3 axle 10-14 tons.
Hercules 3 wheel 10 tons.

GRADERS—CONCRETE MIXERS

4 Yd. 56-S Smith Tilting Mixers, left hand.
2 Yd 56-S Smith Mod T. Tilting Mixer.
2 Yd C.M.C. 56-S Building Mixer, 2 Yd.
2 Yd. Ransome 56-S Builders Mixer, Elec.
28-S Ransome Builders Mixer, Elec.
Cat. Model 112 Motor Grader.
Austin-Western Model 99-M Auto Patrol Diesel.
Koehring Model 34-E Twin Batch Paver.
Ransome 34-E Dual Drum Paver, Diesel Power.

CONCRETE PLANTS AND STORAGE BINS

Johnson 4 Compt. agg. 2 cement, 3 yd. batcher, 888 bbls. cement silo semi-auto controls, etc.
Butler cement bin 105 bbls. Complete.
Aggregate bin 105 tons 3 compts. No batcher.
Butler 300 Ton, 3 compt. bins, 1 for 400 bbls. cement.
448 tons aggregate bin 3 compt. with 4 yd. weigh-batcher and scales, excellent.

ASPHALT PLANTS

Masden 3000# cap. Complete.
Barber-Greene 830-840 Hot Mix.
Barber-Greene Model 848 "Travel Plant".
Barber-Greene 842 Portable Utility Plant. Complete

EUCLID TRUCKS ATHEY WAGONS

3 Euclid Model 49-FD rear dump
6 Euclid Model 27FD Rear Dump.
4 Cat. DW10 Tractors Athey PD10 trailers.
3 Athey FB: two EB 2 way dump wagons.

PUMPCRETES

REX 160-180-190-200 with fittings.

SHOVELS—CRANES—DRAGLINES

Marion Mod 111 M Diesel Hi Lift Shovel
Marion Mod 362 1½ Yd. Shovel, Crane, Dragline.
Koehring 803 Diesel Crane 2 yd. 100' bm.
Koehring 304 Diesel 1¾ Yd Shovel Crane, Backhoe.
Lorain 80 1¼ yd Diesel Shovel. New 1948.
Lima 604 Diesel Crane, new 1948. 100' bm.
P&H 655-B Diesel Shovel, New 1947.
P&H 855B Diesel Shovel 2 yds.
P&H 255A Diesel Shovel-Crane 1948.
Lorain 40 Comb. Complete 1¼ yd.
Lima 1201 High Lift Diesel Shovel.
Lima 1201 Dragline with 100 ft. boom.
Northwest 80D 2¼ yd. Diesel Shovel, 1946.
Northwest Model 6 Diesel Shovel 1½ Yd. New 1946.
Northwest 25 ¾ yd. Diesel Shovel Crane Backhoe.

CONCRETE BOTTOM DUMP BUCKETS

2 Blaw-Knox 1 yd air controlled.
6 Blaw-Knox 1 yd Roller gate.
7 Grabo 1 yd controllable clamshell gate.

TRENCHERS

Barber-Greene Model 44C.
Parsons Model 200 wheel type approx. 2 yrs. old.
Buckeye Model 11, reel type.
Cleveland Trencher Model 15.

STIFF LEG AND GUY DERRICKS

Steel 35 ton stiff leg derrick 100 ft. bm.
American 20 ton stiff leg 90 ft. bm.
American 15 ton stiff leg 65' boom.
Stiff leg derrick 15 tons 100 ft. boom.
American 20 ton Guy derrick 100 ft. boom.
Northwest Model 6 Diesel Shovel 1½ Yd. New 1946.
Lambert Guy derrick 20 ton, 110 ft. boom.
Railroad 50 ton derrick car. Bridge construction.

RICHARD P. WALSH CO.
30 Church St. New York 7, N. Y.
Cable RICHWALSH COrtlandt 7-0723-4

When you see equipment listed in an E.C.A. advertisement you know that we *own it outright* and you can see it at an E.C.A. show room.

CRAWLER CRANES, DRAGLINES AND SHOVELS

1—2¼ yd. Mdl. K520 Link Belt Diesel Crawler Crane #2215, with 50-65-70 or 85' boom and 37'6" tilt, high gantry, hydraulic controls, 10-ton engine. Will handle 47½ ton. Weight 148,000#.
1—1¾ yd. Link Belt Model K370, Ser. No. 2247, equipped with 70' boom, powered by Cat D13000 Diesel engine.
1—1¾ yd. Lorain Model 80, Ser. No. 10750, with 65' boom, powered by Waukesha Hesselman diesel engine.
1—1½ yd. P&H Model 655-A, combination shovel, dragline and crane, Ser. #428, powered by Caterpillar Model D13000 Diesel engine. Crane boom 75', shovel front 24' boom, 18' sticks, 1½ yd. manganese dipper.
1—1¼ yd. Link Belt Model K300, Ser. No. 1959, powered by Caterpillar D13000 Diesel engine with 65' boom. Also have back hoe attachment, boom 23' scoop with 8.36', pull shovel past 11'9" with 1¼ yd. dipper.
1—1¾ yd. Bucyrus Erie, Mdl. 22B, Ser. #16592, gas powered with 50' boom.
1—1¼ yd. 2/3 Northwest, Ser. No. 4561, Powered with 6 cyl. Wisc. Model 10M gasoline engine. With 60' boom.
1—1¾ yd. Link Belt Model K35 crawler crane, Ser. No. 1220. Powered with 4 cyl. Model WL 51 B Waukesha gasoline engine with 50' boom.
1—1 yd. Erie Gas Air Model GA 2 combination shovel and crane, Ser. No. 10629, powered with 4 cyl. Waukesha Model WL55 gasoline engine, with 42' crane boom. Shovel boom 22', sticks 12' with 1 yd. dipper.
1—⅝ yd. Koehring Model 301, Ser. No. 84. Powered by 4 cyl. Wisconsin Model M gasoline engine with 40' boom.
1—⅜ yd. Bucyrus Erie Mdl. 10B, Ser. #14104, gas powered with 28' boom, ⅜ yd. dragline bucket.

WE OWN 15 CRANES NOT SHOWN ON THIS LIST. SEVERAL CRANES LISTED ARE IN OUR RENTAL DEPT. ONLY.

TRENCHERS

Buckeye Model 12, Serial # 12-12, powered by 6 cyl. Buda gas engine, Model HP 226, wheel type. Will cut 24" wide, 3½' deep, all mounted on crawlers.

Parson Model 200 trencher, Serial # 1774, powered by 6 cyl. Waukesha gas engine, Serial # 6BZH174568, wheel type. Will cut 21" wide, 5½' deep, all mounted on crawlers.

BOTH LATE MODEL MACHINES REBUILT

AIR COMPRESSORS

Portable and stationary, electric diesel & gasoline power, sizes from 2 cu. ft., 1,000 cu. ft.

CAR PULLERS

2—Stephen Adamson car pullers, size 999A & 1411. Both 10 H.P. 1—10,000# L.P. 1—5,000 #L.P.

TRUCK CRANE

½ yd. Universal crane #853, with 25' boom, mtd. on 10 wheel Hendrickson pneu. tired truck.

LOCOMOTIVE

1—15 ton Vulcan std. ga. locomotive. Ser. No. 2003. With special McB couplings. Powered by 6 cyl. Ford Mdl. 2MS gasoline engine. Equipped with 8 wheel air operated brakes with 2 cyl. Westinghouse air compressor. Complete with starter and generator.

PUMPCRETE

1—Rex Mdl. 190-RB, Ser. #1144, gas powered, with 6 cyl. Ford engine. Capacity 27 to 30 cu. yds. per hr. Mast vert. lift 110'.

Partial List Only—Send for Stock List—We Buy, Sell and Rent

CLIFTON HEIGHTS, PA.
MAdison 6-2200

1155 So. Washtenaw Ave.
CHICAGO 12, ILL.
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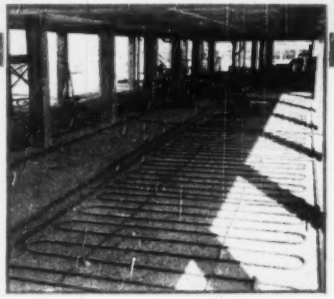


RADIANT HEATED with BYERS WROUGHT IRON PIPE

The $2,000,000 four-wing addition to the Terrell State Hospital for the mentally ill is completely modern in all respects—including the heating. All three floors are equipped with radiant heating. This is not only ideal from a comfort standpoint, but it also eliminates exposed heating units that might invite tampering or cause injuries.

The specifiers followed sound, proven practice in safeguarding the heating installation against premature failure and excessive maintenance, by specifying genuine wrought iron pipe for the coils. Wrought iron is serving in the oldest installations in the country, and its durability is further confirmed by previous records of long life in skating rinks — where installation methods are identical, and corrosive conditions even more severe.

The protection of wrought iron was also provided for three other vital services—steam supply lines; steam return lines; and interior down-spouts. Corrosion is always a threat in such lines, wrought iron has demonstrated its superior resistance by decades of trouble-free service.

The U. S. Public Health Service hospital program is doing a wonderful work in safeguarding the health of hundreds of communities. In any such construction, it is important to safeguard *pocket-books* as well, by the use of durable materials that require minimum maintenance.

You will find some helpful information on the use of wrought iron in radiant heating in our bulletin, "WROUGHT IRON FOR RADIANT HEATING INSTALLATIONS." We will be glad to send you a copy.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, San Francisco. Export Division: New York, N. Y.

WHY WROUGHT IRON LASTS

Wrought iron's longer life comes from its unique nature. Tiny fibers of glass-like silicate slag, threaded through the body of high-quality iron, halt and disperse corrosive attack. The fibers also anchor the initial protective scale, which shields the underlying metal.

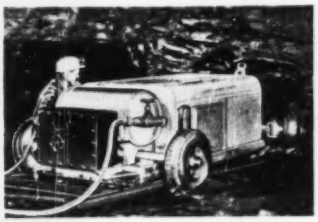
CORROSION COSTS YOU MORE THAN WROUGHT IRON

BYERS
GENUINE WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

NEW PRODUCTS

Electrically Powered Mortar Gun Speeds the Laying of Cement Blocks

Gun for spreading mortar speeds the laying of cement blocks, hollow tile, and similar materials in building construction. The Vita gun is said to be easily handled by experienced or inexperienced men; to make laying of block quick and easy; and to prevent waste of mortar by spillage. The Vita gun will fill-in vertical joints while blocks are in place. Mortar fed into the hopper is driven through the muzzle by a worm drive. The tool operates on 110-v ac or dc circuits.—Vita Labor Saving Tools, Inc., Station Plaza, Smithtown Branch, N. Y.

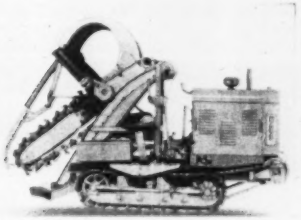


Tunnel Air Compressor

Low over-all height is feature of the new Davey compressors. Units are available in four standard 2-stage sizes to deliver 105, 160, 210, and 315 cfm at 100-lb pressure. Each is available in self-propelled or towable design. Heights of the four models are 32 in. for the 105; 33 for the 160 and 210; and 37 for the 315. Design permits 30-deg. turns.—Davey Compressor Co., Kent, Ohio.

Portable Electric Saw

Six-inch Thor saw features heavy-duty construction. Other features include elimination of worm and bevel gears, die-cast aluminum housings, steel inserts for bearings and threads to maintain critical parts in permanent alignment, built-in saw blower, and steel rip guide.—Independent Pneumatic Tool Co., 175 N. State St., Aurora, Ill.

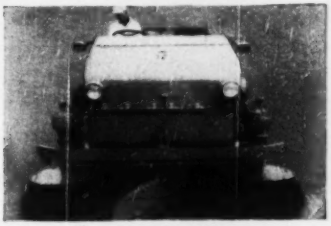


Service Utility Ditcher

Buckeye Model 402 ditching machine has a maximum depth of 4 ft; maximum cutting width of 8 in. Powered by a 47-hp gasoline engine, it has a top digging speed of 1,308 ft/hr. Left-hand crawler is adjustable vertically 8 in. permitting work on uneven terrain or hillsides. Head and tail-shafts are split for ease of service. Ground bearing pressure is 6.1 psi.—Gar Wood Industries, Inc., Dept 022-10, Findlay Div., Findlay, Ohio.

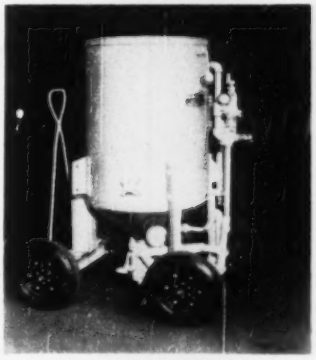
Lightweight Building Panel

Laminated, lightweight building panel is composed of a 1½-in. core of Kaylo insulation faced with ¼-in. cement-asbestos boards. It has high structural strength and is resistant to moisture, flame, and fungus. The Kaylo boards can be installed with ordinary tools. They carry a 1-hr fire-resistance rating. Each panel measures 4x8 ft. Kaylo panels offer complete curtain walls or non-loadbearing sections which require no painting, furring, plastering, or other finishing. Or, they may be decorated conventionally.—Owens-Illinois Glass Co., Kaylo Div., Toledo 1, Ohio.



Motor Sweeper for Airports

Model 450-2 motor sweeper features dual gutter brooms, dual controls, and swath sweeping width of 10 ft. The hydraulically operated hopper has a capacity of 84 ft. Rear-wheel steering provides a short turning radius. Two-speed conveyor system assures fast loading of hopper.—Wayne Mfg. Co., Pomona, Calif.



Sand-Blast Generator

Especially adaptable to bridge-maintenance work, the Ruemelin sand-blast generator has a high-speed blast nozzle which quickly removes rust, scale, and old paint. The generator is mounted on four pneumatic-tired wheels with front wheels on swivel axle. Maximum capacity is 1,000 lb.—Ruemelin Mfg. Co., 3860 N. Palmer, Milwaukee, Wis.

Underground Conduit Insulation

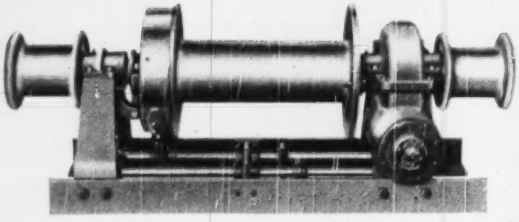
Concrete for insulation of underground conduit is composed of portland cement, vermiculite aggregate, special waterproofing admix, and water, entirely wrapped in a waterproof envelope consisting of three moppings of hot pitch and two layers of tar-saturated felts. This results in a permanent, rot-proof insulation which will not disintegrate from wetting or

(Continued on next page)

PULL *and* POWER

Tulsa Winch models for all trucks from ½-ton up.

Tulsa Winches for all crawler tractors complete with transmission, line roller assembly and mounting brackets ready for installation.



To get the most work from your tractor or truck, install a Tulsa Winch. Available in 28 different models in capacities from 6,000 to 80,000 pounds, there is a Tulsa Winch for every construction job. Get in touch with your nearest Tulsa Winch distributor now or write direct to . . . . .

*Reg. U. S. Pat. Off.

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International Steel furnished structural steel for this high school gymnasium, shown in construction.

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exposure to the elements. The material is applied after all piping operations are completed, so that the Z-Crete forms a monolithic embedment around the pipes.—THE ZONOLITE CO., 135 S. LASALLE ST., CHICAGO 3, ILL.

Smaller-Size Tournadozer

Super D Tournadozer is 3,500-lb lighter and has a smaller capacity bowl than the Super C. It is powered by a 122-hp diesel. Bowl capacity is 2.5 yd. Speeds range to 19 mph. The bowl is cable controlled. Blade can be raised 44 in. above ground. Attachments available include snow plow, root rake, side-boom crane, Tournaskidder overhead winch, single and double-drum power-control unit, and drawbar for cable-operated scraper.—R. G. LETOURNEAU, INC., PEORIA, ILL.

Fire-Hydrant Drainer

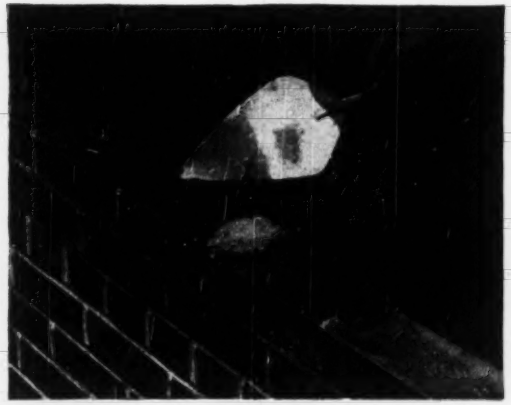
Draining of fire hydrants in winter to prevent freezing is speeded by the Adams jet drain. This unit, coupled with a small air compressor, will completely drain a hydrant in 60 sec. Drain-off hose extends into barrel of hydrant; a simple twist of the wrist tightens a pressurized water-lock. Air-jet valve is then plugged in and attached to the air compressor.—THE JET DRAIN ENGINEERING CO., 215 N. FAYETTE ST., SAGINAW, MICH.

Portable Magnaflux Unit

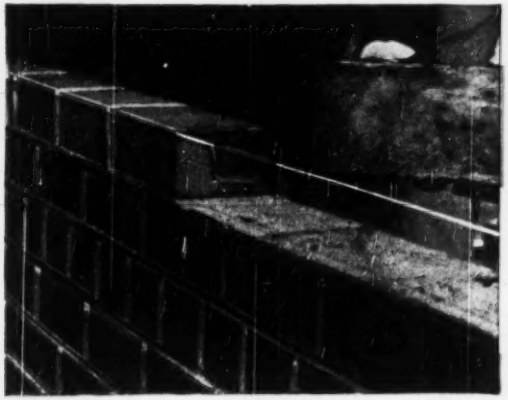
Portable, general-purpose Magnaflux unit can be used to determine hidden flaws or cracks in metal parts. These are made readily visible by a magnetic particle indication built up

(Continued on page 123)

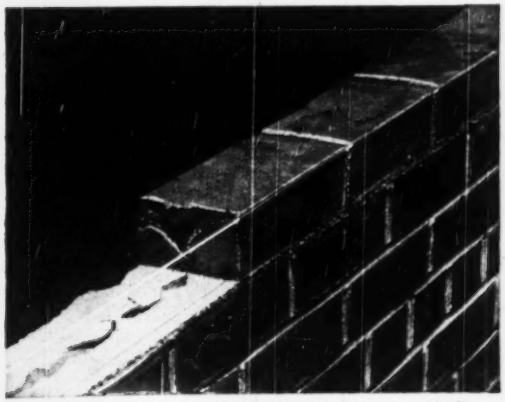
GOOD BRICKWORK = GOOD DESIGN + GOOD WORKMANSHIP + GOOD MATERIALS



Slushing does not properly fill the voids in the head joints.



When mortar is spotted on only one corner of the brick, slushing seldom fills the voids.



Even when mortar is spotted on both corners of the brick, slushing will not always fill the voids.

"SLUSHING" INVITES LEAKAGE IN BRICKWORK

WE SUGGEST THAT—

Brick should always be so laid that when the brick is shoved into place, the head or cross joint will be *filled solid* with mortar, *without slushing*. If the joints are not completely filled, water may leak through the voids to the inside of the building.

The photos at the left show the voids that often result when slushing is used to "fill" a joint. Even when mortar has first been spotted on both corners of the brick, *slushing cannot be relied upon to fill the voids completely.*

The great plasticity of Brixment enables the bricklayer to throw plenty of mortar onto the brick to be placed — to use plenty of mortar in the bed joint — and still shove the brick easily into position, with excess mortar oozing out all around, and with all voids filled.

BRIXMENT

Brixment mortar has greater plasticity, higher water-retaining capacity and bonding quality, greater resistance to freezing and thawing, and freedom from efflorescence. Because of this combination of advantages, Brixment is the leading masonry cement on the market.

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—More work from every crew—every shift
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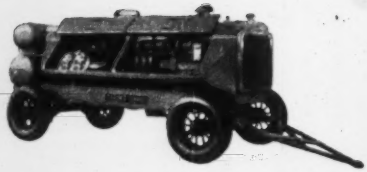
—Less "time out" for maintenance



Two-stage, water-cooled — deliver top air capacity regardless of high elevation, desert heat or sub-zero weather. Sizes from 105 to 500 cu. ft.

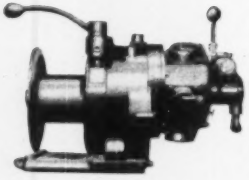
SINKERS High hole-cleaning ability for faster drilling — powerful rotation saves stuck steel and tight holes — easy riding — a size and weight for every rock.

PAVING BREAKERS Safety latch gives extra protection — reduced recoil and shorter length cause less fatigue — three sizes for fast demolition on light, medium or heavy-duty work.

CLAY AND TRENCH DIGGERS Make fast time in clay or hardpan — useful, too, for chopping, cutting or light demolition — furnished with "D" handle or "T" extension handle.

WAGON DRILLS — Maneuverable for quick hole spotting — positive, effortless blowing and handy feed controls for steady footage, faster drilling — three sizes.

Well-balanced for easy handling — ruggedly designed — seldom requires maintenance.



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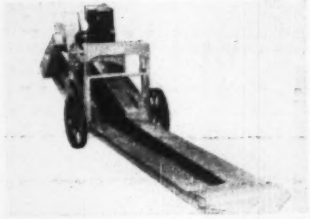
on them by quick magnetization. The KH-05 uses a 110-v ac supply line to give ac or dc magnetization. Completely self-contained, an accessory compartment in the unit contains all the powder and materials needed to run a test. Complete instruction is provided by trained instructors. The KH-05 can also be used with Magnaglo in which the magnetic particles are fluorescent and defects glow when viewed under black light. — MAGNAFLUX CORP., 5900 NORTHWEST HIGHWAY, CHICAGO 31, ILL.



Under-Car Unloader

Combination belt and positive chain-drive hopper-bottom car unloader handles sand, gravel, crushed stone, or any other materials loaded in hopper-bottom cars. Capacity of the new machine is 3 tons per min.— GEORGE HAISS MFG. CO., INC., DIV. PETTIBONE MULLIKEN CORP., 381 CANAL PLACE, THE BRONX, NEW YORK 51, N. Y.

Saw-Blade Pressure Regulator

Save-A-Blade dial on Clipper masonry saws adjusts cutting pressure to conform to hardness of material being cut. Adjustments are available for cutting brick or tile; concrete products; and glass and marble. Cushioning effect is provided by a pressure equalizer spring. — CLIPPER MFG. CO., 2812 WARWICK, KANSAS CITY 8, MO.

Paint-Removing Burner

Oxy-acetylene flame is combined with a low-velocity flow of pure oxygen in this paint-removing burner. The burner is designed for attachment to the Torchweld 75 hand-cutting torch. Replaceable wear-resistant guide shoes maintain correct distancing of burner from metal surface to be cleaned. — NATIONAL CYLINDER GAS CO., 840 N. MICHIGAN AVE., CHICAGO 11, ILL.

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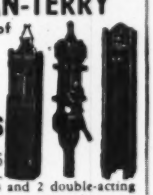
PILE HAMMERS and **EXTRACTORS**



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13 Park Row, New York 7, N. Y.

Plier-Grip Caulking Gun

Can-Do plier-grip caulking gun takes either cartridge or bulk compounds of any consistency. In operation, the feed rod extends under the arm and is out of the way when the plunger is extended. A finger-tip pressure release stops the flow of material. A complete line of interchangeable nozzles are available. The 6½-in. gun has a 15-cu.-in. capacity; the 10-in., a 30-cu.-in. capacity; and the 15-in., a 45-cu.-in. capacity.—WESTERN RESERVE MFG. CO., 3719 E. 93RD ST., CLEVELAND 5, OHIO.

New Product Briefs

Ladder platform attaches to any round ladder rung. The all-aluminum Res-Tep has a non-slip-type safety platform measuring 12x5 in. Manufactured by: Res-Tep, Inc., Euclid 17, Ohio.

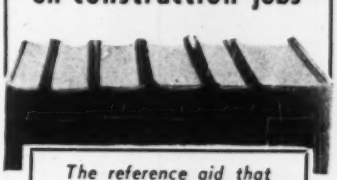
Mildew-inhibiting agent, added during the production stage, is said to prevent deterioration and rotting of V-belts due to this cause. The inhibitor is used in all of the Goodyear Tire & Rubber Co.'s belts.

Concrete vibrators are now available with a lightweight 2-hp gasoline engine. The MRSB 45 and 55 vibrators have 1¾ and 2⅛-in. heads. The regular 4½-hp engine is still available. These vibrators are part of the line manufactured by: Vibro-Plus Products, Inc., Woodside, L. I., N. Y.

Paint-bonding process treats iron and steel preparatory to painting. Poly-Kote (Kelite Products, Inc., Los Angeles 54, Calif.) forms a dense smooth film of low porosity and high plasticity which cannot absorb paint excessively. Material is non-toxic and non-inflammable.

Offset-type bar hanger boxes for armored and nonmetallic cable installations are completely assembled. Ease of installation is feature of this new General Electric assembly.

Save time and money on construction jobs



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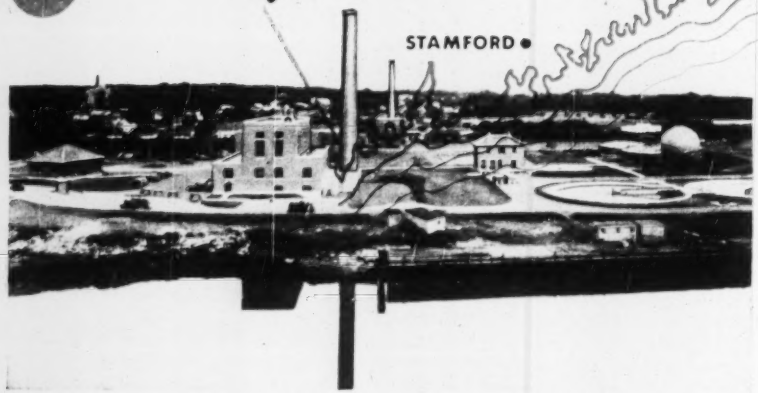
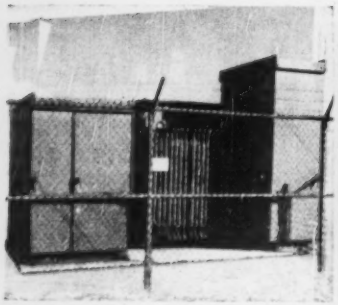
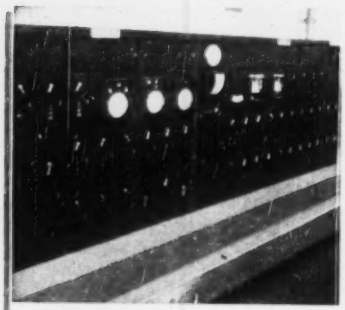


Sewage treatment and incineration are combined into one operating unit at Stamford, Conn. The plant uses the elutriation process to condition sludge. The effluent is post-chlorinated and sludge is flash dried for sale as a soil conditioner.

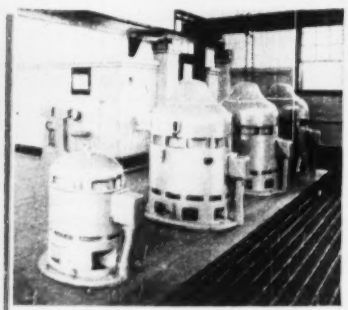
General Electric motors and control used throughout the plant keep running expenses low.



At this outdoor G-E unit substation, high voltage is dropped to utilization voltage for distribution to G-E motors and control throughout the plant. G-E standardized unit substations are completely factory-assembled, ready-to-install units.



One of the nerve centers of the Stamford plant, this G-E Cabinetrol control installation centralizes low-voltage control of motors, lighting, and other auxiliary equipment. Such installations conserve space and save steps; make for more efficient operation.



These G-E vertical motors drive centrifugal pumps which pick up sewage after it passes through bar screens. The control above the first motor automatically selects the pump or pumps needed to handle the flow. Five motors — one 20-hp, one 40-hp, and three 75-hp — are used.

GENERAL ELECTRIC

660-37

CLEAN WATERS

Modern G-E Equipped Combination Wastes Plant Economically Serves City of 70,000

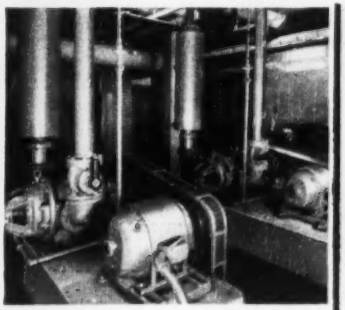
Before 1944, most of Stamford Connecticut's sewage had to run through its treatment plant quickly or bypass it entirely. This created an unhealthful condition in Stamford Harbor and Long Island Sound. Today, *Stamford's waters are clean.*

Finding itself in the same situation as many other cities where the war brought increases in industrial activity and population, Stamford solved its sanitation problem by rebuilding its sewage treatment and incineration plants to combine them into one operating unit.

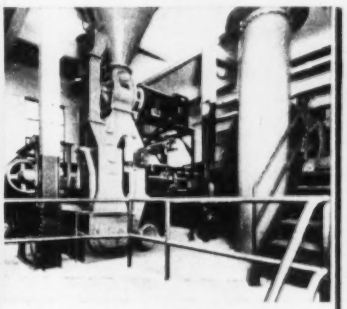
This investment in *clean waters* is returning large dividends in the form of better health, cleaner beaches, and higher community standing. What's more: the plant operator says the power cost of the new plant is less than the old one, thanks to modern processes and equipment recommended by the consulting engineer and General Electric.

General Electric can help your community get that new or improved sewage treatment plant by giving engineering assistance to help you and your consultant —*first* in helping formulate electrical plans and *second* in building public support with the full-color sound movie *Clean Waters.*

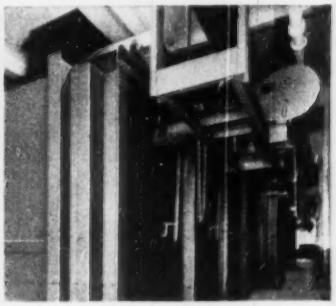
Contact your General Electric office early in the planning stage. The nearest G-E office is listed in your local classified 'phone directory. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*



The Tri-Clad motors shown above are V-belted to vacuum pumps used in the sludge dewatering process. Sludge is pumped from the elutriation tanks into vacuum filters for de-watering. Motors are 15 hp, 1800 rpm, and operate on 208-volts, 3-phase, 60-cycle a-c.



From the vacuum filter, sludge is conveyed from the sludge drying and weighing equipment. Drying and weighing equipment is at left, a dry divider at right rear. View shows one of several G-E motors used throughout the process.



Dry sludge is driven by means of screw feeders into garbage and refuse incinerators when required; normally, however, it is bagged and sold. Tri-Clad is special-purpose, open, gear-motors, mounted on the frame at upper right, chain-drive the conveyors.

CO-ORDINATED SEWAGE-PLANT ELECTRIFICATION

. . . And this bridge will open. But upon your first call, The Earle Gear and Machine Company will be ready to serve you with all of their experience, skill and facilities. Famous for efficient and unfailing bridge operating machinery, Earle Gear can also provide—promptly and accurately—almost any size and type of gear. Earle engineers are always available and pleased to assist you. In many cases, our accumulated knowledge and experience can materially *lower* the costs . . . or *increase* the efficiency of your machines. Write for information, catalogs or service. THE EARLE GEAR & MACHINE COMPANY, 4717 Stenton Avenue, Philadelphia 44, Pa.

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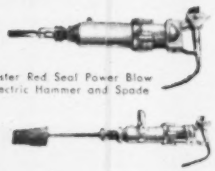
EARLE GEARS

New, Improved Hammer and Tampers

EASIER TO OPERATE, SPEED WORK, LAST LONGER

MASTER'S electric "power blow" hammer is a really tough tool that drills into concrete, chips steel and cast iron, drives stakes, caulks ships—and does other heavy work formerly handled only by "pneumatics." MASTER'S gasoline or electric tampers are light in weight yet deliver powerful blows from 6150 to 8650 per minute. No vibration in the handle to tire the operator. Wide range of attachments for both hammer and tampers. Write for catalog No. 688 and No. 699.



MASTER VIBRATOR COMPANY

118 Davis Avenue, Dayton, Ohio

Manufacturers' Publications

Diesel Oil—Circular on D-A diesel oil describes how and why this product reduces engine deposits and neutralizes destructive combustion chamber acids. A table of recommendations lists grades of oil to use with tractors, trucks, power units, and passenger cars under various temperature conditions.—D-A LUBRICANT CO., INC., INDIANAPOLIS, IND.

Welding-Equipment Folder—Up-to-date operating data on line of welding equipment is available in a pocket-size equipment folder. Full design specifications are given for Eutec-Torch No. 1 and No. 2. The Eutec-Arc double-duty ac arc-welding machine is also covered. Part of the folder is devoted to a complete listing of additional accessories for gas and arc welding.—EUTECTIC WELDING ALLOYS CORP., 40 WORTH ST., NEW YORK 13, N. Y.

Plastic Seal Coat—Product data sheet describes a spray-applied plastic adhesive seal coat and colored mineral granule application for weatherproofing and restoring unsightly and leaky masonry walls. Binderseal-and-Granules coating is recommended for exterior use. The data sheet provides information on proper application methods and on the equipment used.—THE FLINTKOTE CO., INDUSTRIAL PRODUCTS DIV., 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Traveling Screen Cleaning—Schematic installation drawing and a typical wiring diagram are among the engineering details included in a new application engineering data sheet covering control of cleaning cycles for traveling screens. Sheet 821-1 describes plants in which the system is used, and shows how hydraulic loss across trash rack and traveling screen initiates automic cleaning.—THE FOXBORO CO., FOXBORO, MASS.

Electric Cable Hoists—Bulletin describes the Bob-Cat heavy-duty electric cable hoists. It is well illustrated with photographs, diagrams, and line drawings, and provides full descriptions, specifications, prices, and ordering data.—THE OHIO ELECTRIC MFG. CO., 5900 MAURICE AVE., CLEVELAND, OHIO.

Stainless-Steel Curtain Walls—Armco Stainless Steelox—what it offers and how it is used in curtain walls is described in an illustrated 12-p booklet.

Explaining basic functional design of curtain walls, the booklet lists 13 architectural advantages claimed for Steelox panel construction. Eight pages of sketches show how Steelox can be used as either vertical or horizontal units and to provide varied exterior treatments. Sketches show details of sections at masonry walls, wall bases, windows, and plan views of spandrel and strut construction.—ARMCO DRAINAGE & METAL PRODUCTS, INC., MIDDLETOWN, OHIO.

Pneumatic Conveying System—Operation of the Convair system for handling lumpy, granular, or powdered materials in a flow of air or inert gas without segregation, contamination, or excessive abrasion within the system is described in a 12-p catalog. This catalog shows typical installations of the Convair pneumatic conveying systems, and describes the features of operation.—CONVAIR CORP., PITTSBURGH, PA.

Form Engineering—Complete data on a line of concrete-form equipment is provided in the 1950 edition of "Form Engineering". New items listed for the first time include Hex-Lock clamp, Snap-On spacer clamp, form aligners, and reversible waler supports. This 54-p catalog is complete with photographs and diagrams illustrating the principal features of the Williams equipment. Typical job installations and section details are also illustrated. —WILLIAMS FORM ENGINEERING CORP., 1501 MADISON AVE., S.E., GRAND RAPIDS 7, MICH.

Sewage Control System – Bulletin briefly describes the Bristol continuous pH control system for automatically controlling sewage and industrial waste-disposal processes. Bulletin 138 describes typical installations and applications for the pH instruments.—THE BRISTOL CO., 109 BRISTOL ROAD, WATERBURY 91, CONN.

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FARM-TO-MARKET bridge was dedicated formally as part of a "grass-roots" public relations program.

Contractor public relations in Missouri

What can be done in highway public relations at the "grass-roots" level is being demonstrated by J. George Robinson, assistant manager, Associated General Contractors of Missouri, Jefferson City. This program is two-fold: (1) To show the people of Missouri that the contract system is the most economical method of highway improvement; and (2) to let them know what they're getting.

It works this way: When a stretch of highway improvement is built or an important bridge is completed by a member contractor of the Missouri AGC, regardless of whether it is on the primary, secondary, or local road system, a story is prepared for local newspapers. It usually contains all the salient points of the project, but with emphasis on the fact that the contract system pays off.

In some cases, the local newspaper reporter is given a guided tour over the project and supplied with information by the resident engineer, the contractor, or Robinson. Obviously, all completed projects cannot be given this treatment, but those that are pay dividends in good publicity.

• **Taxpayer gets a bargain**—Both the low bid and either the high bid or the average of all bids are given, to point out that obtaining the completed project at the lowest bid price was a result of competitive bidding under the "contract" system. When the taxpayer compares the contract price with the high bid or average bid, the cost appears to be a bargain.

On secondary, or farm-to-market, roads, the county's share of the cost of the project (gasoline and motor excise tax) is given. Compared to the total cost of the project, this shows the motorist in that county what he is getting.

In some instances, the cost of the highway or bridge project runs two or three times the total yearly gasoline and motor excise taxes collected throughout the entire county and paid into the state highway fund. In addition, the competence of those in charge of the job, both highway engineers and the contractors' superintendent, is pointed up in most cases. This competence is evidenced by their years of training and experience.

The wealth that accrues to the state from resort and tourists travel ($200 million in 1949), made possible by good roads, also is emphasized. The news story also goes on to ask for or thank the traveling public for its cooperation in observing safety precautions.

This all adds up to what ultimately should help get the needed financing for an adequate road program in Missouri: favorable legislation, backed up by general public approval of increased fuel taxes.

• **Small bridge is dedicated**—Good public relations at the local level was demonstrated last March, following the completion of a farm-to-market bridge in Miller County (see cut). The bridge was so important to the welfare and convenience of the two neighboring towns of Meta (population 381) and St. Elizabeth (population 175) that they held a dedication ceremony—complete with ribbon-cutting, music and a basket dinner.

The ceremonies also included speeches by State Senator Hawkins and Robinson. The latter pointed out that the total cost of the 304-ft, 20-ft roadway bridge ($75,000) was three-fourths the total amount of gasoline tax and motor license fees paid last year by Miller county.

What made this bridge so important to the people in that community was the fact that the old bridge had been washed out three years ago, necessitating a long detour for delivering farm produce to a nearby railroad shipping point.

Another goal of the public relations program is to reduce the amount of work done by the "force account" or day labor method of construction, by the constant reminder that construction by contract safeguards public funds. This is usually done in a direct manner through a paid advertisement in the same issue of the newspaper which carries the story about the construction work. Ads are also run in periodicals which are read by engineers and owners.

• **Safety promotion**—Another part of the program is the promotion of safety with both the traveling public and the contractors' own personnel. This is a long range program, looking toward the time when Missouri will be known as the state with the polite, safety conscious contractors.

A series of suggested signs to be erected on highway construction projects has been developed. They carry a warning in a polite manner, such as "Please drive carefully—this improvement is for your future enjoyment," also the contractor's name where space permits. The signs not only get cautious driving from the public but remind workers of safety needs.

Rubber stamps, with the words "Another Safe Job," have been made for distribution to contractors. This stamp is placed on all construction pay checks until the contractor can have a new supply printed with the same words. This informs a lot of people of the contractors interest in safety.

profit-wise Contractors buy MICHIGAN ½ yd. Crawler Cranes!

There's no other half-yard crawler crane excavator as good . . . dollar for dollar . . . as the MICHIGAN! Why? Because only MICHIGAN gives you these job-proved, "big-machine" features:

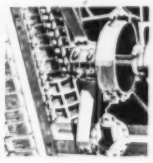
Independent travel to save minutes on every move, hours on every job. Tractor-ease steering to enable faster, easier maneuvering. Automatic, self-locking crawler brakes to give complete safety when working on grades. Smooth fingertip air control to eliminate operator fatigue and that "afternoon let-down."

But, that's not all. There's the oversize internal-tooth circle gear . . . the hook rollers and independent drum assemblies . . . and there are many more. Compare MICHIGAN with any other half-yard crawler crane . . . then you, too, will agree it's your best buy! Take the first step in getting more for your money . . . write, wire or 'phone for complete details.

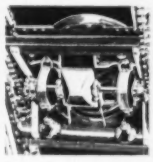
MICHIGAN POWER SHOVEL COMPANY

500 Second Street, Benton Harbor, Michigan, U. S. A.

INDEPENDENT TRAVEL — Standard equipment. Crawler mechanism powered through intermediate shaft's forward and reverse gears — not through swing gears.



AUTOMATIC-LOCKING BRAKES — Hold crawlers against downhill movement when working on grades, a feature operators appreciate. Brakes lock instantly, are released by air rams.



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FINGERTIP AIR CONTROL — Air pressure to a clutch ram is regulated instantly as operator desires, thus giving him complete control and "feel of the load" at all times.

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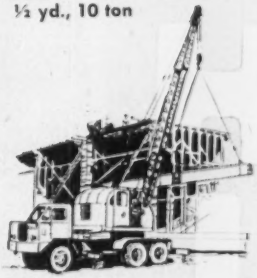
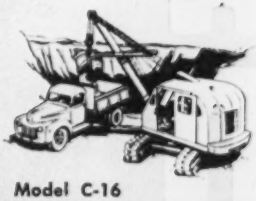
⅜ yd., 6 ton

Model TMDT-16
½ yd., 10 ton



Model TLDT-20
12 ton

Series 8
½ yd., 8 ton



Model C-16
½ yd., 8 ton

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Line contact between the rollers and races of Timken bearings gives greater load-carrying capacity. Due to their tapered construction, radial and thrust loads are carried in any combination. Thanks to the true rolling motion and smooth surface finish of Timken bearings, friction is virtually eliminated. Timken bearings permit tighter closures that retain lubricants more effectively. Maintenance time and material costs reduced.

Under normal conditions, Timken bearings last the life of the machine because they (1) are engineered for the job, (2) are made of Timken fine alloy steel, (3) are precision manufactured.

No other bearing gives you *all* the advantages you get with Timken bearings. Over fifty years of bearing research and development have made them first choice throughout industry. Whether you build or buy machinery, insist on Timken bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

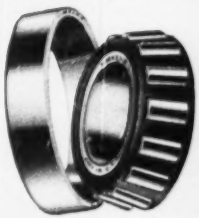
This symbol on a product means its bearings are the best.

UNIT CRANE AND SHOVEL CORPORATION *uses Timken bearings on vertical swing and idler shafts as well as the front and rear axles of their Unit 357 crane.*

"BE SURE TO VISIT US AT THE METAL MINING CONVENTION AND EXPOSITION, SALT LAKE CITY, UTAH BOOTH 33"

TIMKEN

TAPERED ROLLER BEARINGS



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